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AUDIO-VISUAL AIDS TO INSTRUCTION

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AUDIO-VISUAL AIDS TO INSTRUCTION

BY
HARRY C. McKOWN
Author of "Extracurricular Activities," "School Clubs," "Assembly and Auditorium Activities," "Commencement Activities," "Homeroom Guidance," "Character Education," "Activities in the Elementary School"

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First Edition
Ninth Impression

McGRAW-HILL BOOK COMPANY, Inc.
NEW YORK AND LONDON
1940

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PRINTED IN THE UNITED STATES OF AMERICA

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PREFACE

One of the most discouraging things about traditional education is to be found in the premium that it places upon pupil failures. For a long time the expression "a good teacher" has usually meant "a strict teacher"; and "strictness" has usually been associated, directly and indirectly, with "high standards" and, consequently, with academic failures. In short, it has been easy to assume that a teacher who "flunked" a considerable proportion of her pupils thereby proved her teaching ability. Obviously, this educational philosophy is thoroughly illogical and unjustifiable. It would be just as reasonable for a manufacturer, say, of automobiles, to claim distinction because a considerable number of his cars "failed." However, this defeatist philosophy has long dominated American educational institutions, and it still dominates them entirely too much.

On the other hand, one of the most encouraging things about modern education is the increasing emphasis that it places upon scholastic success. Clear-thinking and farsighted educators—teachers, administrators, and theorizers—are realizing that the success of the schools must be rated on the successes, not on the failures, of the pupils in these schools. And as a result of this changing philosophy these educators are now, more than ever before, searching for ways and means of reducing pupil failures and increasing pupil successes. Proof of this statement is to be found in such evidences as the number and extent of the investigational researches that are being carried on in all parts of the country, and in such other recent developments as curriculum revision, measurement, plant construction, reorganization, and guidance. And, further, this changing attitude also accounts for most of the present widespread interest in the "audio-visual aids."

Just what are these audio-visual aids? Specifically, how, to what extent, and under what conditions do they "aid"? Which types are best suited to the various grade levels, subjects, and kinds of instructional materials within these subjects? How can they be utilized to replace antiquated and obsolete methods and materials? How can they be incorporated as integrative and supplementary, rather than as separate and substitutionary, agents? In what ways can they be utilized most effectively? How can teacher and community support be developed? How much do they cost? Where can they be obtained? The purpose of this book is to answer these and other similarly pertinent questions.

Naturally, it would be impossible to tell the whole story of audio-visual instructional possibilities in a single volume, so the authors have emphasized the phases that, in their opinion, will be most useful and helpful to teachers and administrators. Theory has been limited to essentials. Not only has practice been emphasized in connection with the discussions of the various aids, but, in addition, three chapters of examples of actual uses in all grade levels of the elementary and the secondary school have been included. Similarly, the references have been carefully selected on the basis of pertinency, practicability, availability, recency, and variety.

The reader of this book, or of any similar book for that matter, should remember that as a general movement audio-visual instruction is still in its infancy. It has had an enormous growth during the past five or six years, but it has not yet reached maturity. Consequently, the reader should not assume that all the questions suggested above can now be answered completely, conclusively, accurately, and permanently. The present pioneering efforts of educational and producing leaders will result in new and improved materials, equipment, organization, techniques, and emphases which ultimately will bring these more thorough, conclusive, accurate, and permanent answers. And in this work of pioneering the teacher herself will have an important part through utilizing, adapting, experimenting, and evaluating. This is both her opportunity and her responsibility.

The authors wish to express their appreciation to the many persons who have helped to make this book possible and to the various publishers for permission to use copyrighted materials. They are especially grateful to the following for constructive criticisms and helpful suggestions: Harry Aldus, Director, Visual Aids Program, Galesburg, Ill.; William C. Bicknell, Instructor in Education, University of Missouri; Lee Cochran, Supervisor, Department of Visual Instruction, University of Iowa; Ellsworth C. Dent, Director, Educational Department, R.C.A. Manufacturing Company, Inc., Camden, N. J.; Wilber Emmert, Director, Visual Education, State Teachers College, Indiana, Pa.; Marian Evans, Director, Visual Aids Education Activities, and James House, Technical Assistant, San Diego Public Schools, San Diego, Calif.; Erna Grassmuck Gilland, Consultant in Geographic Education and Chairman, Education Relations Committee, National Council of Geography Teachers, California, Pa.; Nelson L. Greene, Editor, *Educational Screen*, Chicago, Ill.; W. E. Hess, Assistant Director, Discussion Group Project, National Association of Secondary

School Principals, Washington, D. C.; John A. Hollinger, Director, Department of Science and Visualization, Pittsburgh Public Schools, Pittsburgh, Pa.; James S. Kinder, Professor of Education and Director, PCW Film Service, Pennsylvania College for Women, Pittsburgh, Pa.; F. Dean McClusky, Director, Scarborough Schools, Scarborough-On-Hudson, N. Y.; L. V. Peterson, Supervisor, Visual Aids Service, University of Illinois; Lulu Spilde, Director of Extension, Southern State Normal School, Springfield, S. D.; Zoe A. Thralls, Associate Professor of Geography and Education, and Gerald A. Yoakam, Professor of Education, and Director of Courses in Elementary Education, University of Pittsburgh; A. G. Tillman, Professor of Geology and Geography, Western Illinois State Teachers College, Macomb, Ill.; C. R. Van Nice, Managing Editor, *School Activities*, Topeka, Kan.; and W. W. Whittinghill, Director, Department of Visual and Radio Education, Detroit Public Schools.

HARRY C. MCKOWN.
ALVIN B. ROBERTS.

GILSON, KNOX COUNTY, ILL.,
October, 1940

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EDITOR'S INTRODUCTION

In spite of the fact that education is a most important human agency, which by its very nature requires thorough understanding and utilization of all means of communication, it is often the last to employ new and improved methods for the transmission of thought. For a long time after the invention of printing, lectures and manuscript notes were thought to have a certain pedagogical superiority over the products of the presses. Even today an occasional university professor drones forth his daily quota of facts and theories from lecture notes in disregard of the economy of time and effort which might be gained by having his students consult the same printed sources from which he derives his own classroom wisdom.

In most areas of education, however, the value of books and other printed materials has long been recognized. In the meantime new means of communication have been developed. Such powerful instruments as the phonograph, the motion picture, and the radio have been perfected and used extensively outside the school. Their strength and usefulness have been demonstrated. The part they can be made to play in the modification of human behavior is seen to be undeniably very great. Yet the great mass of teachers on every level of the school cling to the book in what amounts almost to a passionate devotion.

Teachers do well to cling to the book if they will only cling to it with eyes open to the uses of other than printed aids to learning. With each step forward in the improvement of newer means of communication it is not at all true that the importance of printed materials necessarily diminishes. In some cases it becomes greater, as when a pupil reads *Silas Marner* with increased vividness of appreciation after having seen the motion picture production of that classic, or studies his geography with a wealth of concrete imagery about Antarctica derived from hearing the broadcasts from Little America. In fact it is very probable that the potential value of the book as an aid to learning was never so great as it is today precisely because of the development of auxiliary devices for the interchange of ideas and emotions.

Under these circumstances every teacher needs to have at his command all the tools of the trade in order to be truly successful with any one of them. He will avoid the quackery of relying upon a single cure-all supposedly good for all situations. He will not try to teach history by book and lecture alone any more than he will fall into the notion of teaching natural science by exclusive use of microscope and test tube. He will recognize the essential purposes of each phase of his instruction. He will study the factors in each learning situation. He will know the capacities of his pupils and how their abilities and interests may be directed. Then, upon the sure foundation of a sound and comprehensive knowledge of the teaching problem in any instance, he will select methods, devices, and aids to learning which in his best judgment will give superior results. He will study the operation of those factors as he employs them, shifting them, changing them, replacing them as the need arises. Thus he will be a professional worker with a full complement of skills and instruments rather than a rule-of-thumb operator who has faith in only two or three prescriptions because those are all he knows.

The present volume is an admirable guide for one who wishes to reach this professional level of skill with respect to the audio-visual aids. It discusses the principles and describes the practices whereby education is being profoundly changed in method of presentation. It is a handbook for the teacher and administrator who hold to the ancient goal of the greatest learning with the least pain.

HAROLD BENJAMIN.

UNIVERSITY OF MARYLAND.

AUDIO-VISUAL AIDS TO INSTRUCTION

CHAPTER I

THE SCOPE OF AUDIO-VISUAL INSTRUCTION[1]

Modern society is now making unprecedented demands of its educational institutions, and probably most of these demands are logical, reasonable, and desirable. In an early day life was simple, and what formal education was provided was not only somewhat innocuous but also relatively inexpensive. Few individuals questioned either its value or its cost. The unsupervised schoolmaster, left largely to his own devices, taught what he wanted to teach, and taught it in his own way. And he was probably at least fairly successful in his work.

Then came expansion. Population increased by leaps and bounds; boundaries, mental and social as well as physical, were pushed back; discoveries and inventions increased man's interests and activities; and society, in all of its phases, became complex. Formal education also increased in size and complexity; the one-room school became a large, and often an immense, plant; little or no special equipment grew into a great array of appliances, materials, and devices; the three R's developed into an amazing schedule of general and diversified curricula; unspecialized teaching gave way to specialized instruction; the single schoolmaster was replaced by a faculty of more or less highly trained specialists; and, of course, the small cost grew into a large expenditure.

Into this new setting came two outside critics. One believed in education but was skeptical of the means, methods, and materials by which it was promoted, as well as of the extent to which it was achieved. Demanding efficiency in the other phases of his life, it was easy for him to demand efficiency in educational affairs. The second outside critic knew little about education and cared less but was interested in keeping down its rapidly mounting cost. Taking advantage of the opportunity, two insiders immediately joined the outside skeptics, one an opportunist who was quick to realize that it was not complimentary to have outsiders pick out faults and weaknesses which he should have seen first, and the other a serious-minded educator who had always been sincerely desirous of improving practice in his field. And, naturally, other outside and inside critics were quick to support the traditional and conservative in education. As a result, at the present time education is being discussed, both favorably and unfavorably, more than ever before in the history of the nation.

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[1] See pp. 6–7 for an explanation of the use of this expression.

In short, although modern society is still willing to pay for education, it is increasingly demanding proof of the value of its investment. It is demanding businesslike efficiency in educational activities. In general, the thinking part of it is coming to care little more for traditions in education than it does for traditions in transportation, manufacturing processes, or wearing apparel. Increasingly, its attention is being centered on what is, or what should be, accomplished in the lives of children and young people.

Reacting to these outside and inside criticisms, educators have originated, developed, introduced, and promoted many new and readapted types of organization, materials, devices, methods, and procedures, such as, for instance, the junior high school, general subjects, integration of subject matter, socialized recitation, supervised study, organized guidance, scientific measurement, personnel work, extracurricular activities, pupil transportation, and modern housing. Undoubtedly progress has been made towards the ideal which society is demanding. And just as certainly more progress will be made as educators have additional experience, and with it greater maturity in their profession.

One of these "newer" educational movements, and one which promises to have a tremendous influence because it attacks the problem vitally at the bottom through actual teaching, instead of more or less superficially at the top through reorganization, is audio-visual instruction.[1]

WHAT IS MEANT BY AUDIO-VISUAL INSTRUCTION?

Although it may appear to be putting the cart before the horse, yet because of the widespread misinterpretations of audio-visual instruction, the elimination of the most common of these at the very beginning will help to point the way from what it is not to what it is.

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[1] A broad and scholarly view of the origins of the visual idea is given by Wendell Thomas in The Stream of Perceptual Teaching, *Educational Screen*, vol. 18, pp. 326–327, November, 1939.

Audio-visual Instruction Is Not Concerned Only with Motion Pictures, Either Silent or Sound.—Once invented, the motion picture developed with amazing rapidity and it was but natural that reflections and adaptations of its commercialized form should appear in various kinds of instructional activities. And, apparently, it was just about as natural for many individuals to think of it and "visual education" as being synonymous. The motion picture is one of the most spectacular, popular, and important of the audio-visual aids,[1] but a glance at the list on pages 7–8 should immediately convince anyone that it is by no means the only one.

Audio-visual Instruction Is Not a Separate School Subject.—Although there are departments of, and courses in, audio-visual instruction in teacher training institutions, yet in its applied form it is not a subject separate from the other subjects of the curriculum. Like composition, it has no content of its own. It permeates all instruction. It is a part of a teaching method designed to aid in the presentation of materials—knowledge, concepts, and ideas—in literature, mathematics, science, shopwork, and other fields, both curricular and extracurricular, so that they are more easily and clearly understood and appreciated. Audio-visual aids do not exist separately; they are, in reality, only aids to instruction.

Audio-visual Instruction Is Not a Substitutive Educational Device. For many centuries in man's early history after speech developed, experience was transmitted and instruction was given largely through the spoken word. Some six thousand years ago the written word came into existence. Today these two—the spoken word and the written word—are still the most important channels of instruction, and they will probably remain so despite those individuals who fear "robot instruction," and those prophets who see them shortly replaced by the radio, electric transcriptions, films, and other devices now included in the audio-visual program. As suggested before, these devices are supplemental only. Listening to and reading about will always be done, but they will be done more successfully and happily through a proper capitalization of these aids. The value of aids as "aids" is easily proved, and has been convincingly proved, by comparing the results of using aids with and without previous preparation.[2]

Audio-visual Instruction Is Not Mere Entertainment.—Sad to relate, there are still teachers and administrators who believe in "discipline" and maintain that the more difficult and distasteful schoolwork is, the more educative it is. These individuals are either ignorant of, or out of sympathy with, modern educational philosophy and psychology both of which stress the vital part interest plays in learning. The extreme "disciplinarian" (the "hard marker") tends to rate her success, not by the extent to which her pupils learn, but by the extent to which they do not learn, and her index of success is the proportion of high marks which she does not give.

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[1] See the quotation from the "Thirteenth Yearbook" of the Department of Elementary School Principals, on p. 50.

[2] See footnote reference on p. 16 to investigational and research studies.

To this teacher any device or procedure that is designed to lessen learning difficulties or make schoolwork more intriguing represents "soft pedagogy"—entertainment—and not education. Perhaps, in one way, this attitude is somewhat easy to take, especially in the case of aids which closely resemble or are adaptations of commercialized diversions such as dramatics, motion pictures, and trips.[1] As will be pointed out in detail later, audio-visual aids are not designed merely to amuse the pupil but to increase his interest in and his comprehension of the topic being studied by presenting several different slants on it, especially through his two most used senses, sight and hearing. In no way are they "cheap tricks to kid the pupils into learning," as one teacher of the old school described them.

Audio-visual Instruction Is Not New.—Although the expressions "visual education," "visual instruction," "visual aids," and "audio-visual instruction," "audio-visual aids," and "visual-sensory aids" are of recent origin as far as professional literature is concerned, the method involved is very, very old. In fact, because it is both simple and natural, it is probably the oldest method of conveying ideas. Primitive man certainly learned to convey his thoughts by signs, gestures, facial expressions, and crude imitations long before he developed a vocabulary with which to express them orally. Primitive youth were doubtless taught to hunt, fish, swim, and protect themselves from enemies and the weather through observation and imitation. Later came hieroglyphics or picture writing, and centuries later, the many and varied forms of early alphabets which found their way successfully onto clay tablets and papyrus. And, incidentally, the farther away expression got from the earlier and simpler forms, the more abstract and difficult to understand it became.

Even in formalized education visual aids have been used for centuries. Sand, boards, and slate, on which marks were made and diagrams were drawn, were the predecessors of the modern blackboard. Real objects and specimens have always been used to illustrate and inform. Trips were common in the ancient Greek schools, and these and other aids were recommended and used by Pestalozzi, Rousseau,

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[1] See the footnote reference to the term "excursion" on p. 181.

Froebel, William Penn, Benjamin Franklin, Horace Mann, and many other great thinkers, educators, and leaders. Nearly two centuries ago the British Museum encouraged the "people, teachers, and children" to use its collections. As printing developed there came reproductions of drawings, and in 1658 Comenius' "Orbis Pictus," the first illustrated textbook, followed in 1690 by the famous "New England Primer" which was used for more than a hundred years.[1] And, of course, with the invention of photography by Niépce and Daguerre in the nineteenth century and the development of modern engraving processes, the possibilities of utilizing illustrative materials in books and other forms for classroom purposes multiplied many times.

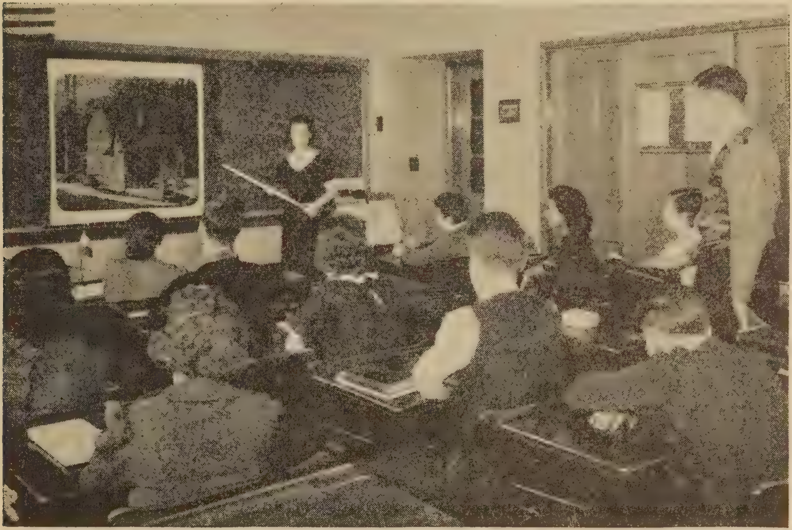

FIG. 1.—To many individuals "visual aids" means slides and motion pictures. Both slides and motion pictures are very important in this field, but there are also other helpful types of audio-visual aids. (*Courtesy of Keystone View Company.*)

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[1] A most interesting development in the reproduction of books is described by Watson Davis in Microfilm Hailed as a New Way to Duplicate Books, *Science News Letter*, vol. 31, pp. 179–180, Mar. 20, 1937. In this article Mr. Davis describes how six pages of an ordinary book can be reproduced on a microfilm of about 1″ × 5″ in size. He further states that, if the images can be reduced to one-fourth their present size, which appears probable, a 240-page book can be reproduced on film the size of the usual cataloguing card. In such instance a whole library would require no more space than that now occupied by its card catalogue. These "books" will be read from a translucent screen.

Another interesting possibility is the "talking book" which will be listened to, not read.

In summary, while the ancients knew nothing about the electric map, opaque projector, motion picture, strip film, or phonograph, they at least knew the value of the original and basic forms of audio-visual aid.

Perhaps from the above negative discussion a positive definition of audio-visual aid is apparent. In the oft-quoted words of Dorris, "Visual Instruction simply means the presentation of knowledge to be gained through the 'seeing experience'."[1] According to Roberts, "Visual education is a method of imparting information which is based upon the psychological principle that one has a better conception of the thing he sees than of the thing he reads about or hears discussed."[2] And Dent defines visual-sensory aids as "all materials used in the classroom, or in other teaching situations, to facilitate the understanding of the written or spoken word."[3] In short, these aids are supplementary devices by which the teacher, through the utilization of more than one sensory channel, helps to clarify, establish, and correlate accurate concepts, interpretations, and appreciations.

The earlier used expression "visual education" has been largely replaced by the more accurate "visual instruction," but, even though this is widely used at the present time, it too has serious limitations. Nearly all forms of dramatics, for instance, bring both a visual and an auditory experience, as does also a "talkie" description of an object, an explanation of a graph, or a transcribed discussion of a music program. Sound films, radio programs, and phonograph records have broadened the original narrower conception of visual instruction.[4]

Further, touch, taste, and smell can also be classified as channels for instructional aids. Touch in certain kinds of shopwork, taste in cooking, and smell in chemistry aid the same as visual and auditory experiences in these and other subjects. Perhaps "sensory aids," or "aids to perceptual learning," as Hollinger suggests,[5] might be a more accurate term than any of the other expressions used. However, the average learner uses touch, taste, and smell infrequently and hence they represent but a relatively small part of his sensory experiencing. In short, an individual gets the great proportion of his experience through his eyes, a smaller proportion through his ears, and a great deal smaller proportion through his other senses.[1] Therefore, on the basis of number and pertinency of experiences, "audio-visual aids" or "audio-visual instruction" appears, at least at the present time, to be the most appropriate expression. "Visual aids" is too limited in scope, and "sensory aids" is too inclusive.

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[1] DORRIS, A. V., "Visual Instruction in the Public Schools," p. 6, Ginn and Company, Boston, 1928.

[2] ROBERTS, A. B., An Introduction to Visual Aids, *School Activities*, vol. 10, pp. 212–214, 221, January, 1939.

[3] DENT, E. C., "The Audio-visual Handbook," rev. ed., p. 1, The Society for Visual Education, Inc., Chicago, 1939.

[4] In his article Audio Aids in a Visual Program, *Educational Screen*, vol. 17, pp. 39–42, February, 1938, Arnold P. Heflin discusses the place of these auditory aids and describes some interesting utilizations of them in the Lane Technical High School, Chicago. See also Chap. X.

[5] See HOLLINGER, J. A., Perceptual Learning, *Educational Screen*, vol. 19, pp. 49–50, 74, February, 1940.

The expression "audio-instruction" cannot be used accurately to designate "auditory aids" because it includes every word spoken by a teacher in an educational setting, while the latter expression refers more particularly to the newer devices suggested above—sound films, radio programs, and phonograph records. However, because of the practical necessity for a compact and easily recognized expression, the authors will use the somewhat inaccurate "audio-visual instruction" to mean "audio-visual aids to instruction."

Obviously, even though in general it is possible to recognize what sensory channels are, on the basis of use, most important, it would be difficult to isolate and distinguish the contributions of each in cases where several are being utilized. Consequently, any discussion which distinctly and completely separates them is certain to be inaccurate. However, here again the practical problem of presenting them clearly necessitates such distinction and discussion.

TYPES OF AUDIO-VISUAL AIDS

The most commonly used types of audio-visual aid are those listed below. Although, obviously, these may be classified in a number of different ways,[2] the classification used is satisfactory for our purpose here, which is merely to indicate the extent of the field. No importance should be attached to the order of these groups; it is alphabetical only.

Blackboard and bulletin board.
Charts: table, stream and tree, and organization or flow.

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[1] G. Carl Weller has interestingly pointed out (*Educational Screen*, vol. 15, p. 244, October, 1936) that in the Bible the word "nose" occurs 12 times; "skin," about 100; "tongue" or "tongues," about 200; "ear" or "ears," approximately 250; and "eye" or "eyes," about 550 times.

[2] For instance, these items might be classified into two groups as either "equipment" or "aids." In such a grouping a phonograph would be classified as "equipment" and a phonograph record as an "aid."

Dramatics: pantomime, playlet, pageant, puppet show, shadow play.[1]
Flat pictures: photographs, prints, and post cards.
Graphs: pictorial statistics, bar, area, line, diagram.
Maps: flat, relief, projection, electric, globe.
Models, objects, and specimens.
Motion pictures: silent and sound.
Phonographs, records and transcriptions.
Posters, cartoons, and clippings.

FIG. 2.—Postman Ovus Fuson spent a part of his "day off" in explaining the United States mail service to these Springfield, Missouri, pupils.

Radio, dictaphone and loud-speaker (classroom), public-address and intercommunicating systems.
Stereoscopes: hand and telebinocular, and stereographs.
Still pictures: flat—photographs and prints.
  Projected: opaque and daylight, positive transparencies.
    Slides: glass, Cellophane, film strip, ceramic.
Trips, journeys, tours, and visits.

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[1] Although undoubtedly dramatization represents a significant type of audio-visual instruction, it will not be discussed here, the authors preferring to devote the limited space of this book to topics on which the literature is less voluminous and available. For practical material on one important phase of school dramatics see H. C. McKown, "Assembly and Auditorium Activities," The Macmillan Company, New York, 1930.

AUDIO-VISUAL AIDS IN MODERN LIFE

Although, as was pointed out earlier in the chapter, visual and auditory aids have been used as vehicles of instruction from about the beginning of time, modern educational, commercial, and professional complexities brought a new demand and, as a result of this demand, man's inventiveness has originated, developed, adapted, and applied them in many and varied forms. They are to be found all around us in our day-to-day living.

Consider for a moment how photographic, engraving and reproducing processes have filled our books, magazines, newspapers, and other publications, as well as our bulletin boards and billboards, with pictures, cartoons, drawings, graphs, advertising illustrations, charts, and maps; how the science of display has made our stores and their windows, our museums, and our other exhibits more intriguing; how the microscope and telescope have revealed worlds we did not know existed; how the stereograph and stereoscope have made pictures appear most natural by giving the three-dimensional illusion; how exhibits have brought us customs, costumes, processes, practices, and products of other peoples and other times; how the radio, public-address system, and the phonograph have presented us with distant programs by unseen speakers, players, and musicians; how trips, commercial and otherwise, have deepened our interest in, and widened our knowledge of, other peoples, ages, and places; and how the motion picture has faithfully reproduced settings, scenes, actions, and processes representing the life, literature, and history of all parts of the world. All these devices through their accurate and vivid representation have exerted a tremendous influence in enlightening, in setting standards, and in giving widespread distribution to all types of ideas, processes, practices, and products.

AUDIO-VISUAL AIDS IN EDUCATION

The extent of the current interest in these devices is evidenced by their utilization for educational purposes in industry, commerce, trades, and professions; in all types of formal instruction—lower and higher, child and adult, public and private, general and specialized;[1]

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[1] In 1932, George A. Stracke (What Is Being Taught in Courses in Visual Instruction, *Educational Screen*, vol. 2, p. 204, September, 1932) discovered that the less spectacular aids such as object-specimen-model materials, flat pictures, blackboards, and textbook photographs and illustrations, were to be found in from 3 to 5 per cent, and their administration in 9 per cent, of the thirty-three courses offered, while in 1937 W. Gayle Starnes reported these same topics were included in from 75 to 87 per cent, and their administration in 75 per cent, of the seventy-

in recreational, social, and religious activities; in the Army, Navy, Air Service, and Civilian Conservation Corps camps; by their reflection in books,[1] magazines,[2] departments of professional journals, bulletins, newspapers, and other publications; by the number of departments and sections of local, state, and national educational associations and organizations;[3] by the many investigations, researches, and surveys centering around them:[4] and by the appearance of such educational officers as supervisors and directors of visual instruction.[5]

Further, numerous schools now make use of the many public and private loan services, and some of the smaller schools are uniting to develop their own cooperative organization, each adding a few films to the general library every year. Many schools, and nearly all of the larger systems, now have their own departments of visual instruction and some of these have their own libraries. Nearly all state universi-

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nine courses offered. The first course, according to his investigation, was offered in 1921. A brief of his survey will be found in *Educational Screen* for December, 1937, and January, 1938, under the title, The Present Status of Teacher Training in the Use of Visual Aids. E. Winifred Crawford's article, A Study of the Status of Visual Education Courses in Teacher-Training Institutions, *Secondary Education,* vol. IX, no. 3, pp. 161–170, May, 1940, describes the offerings of 42 colleges preparing secondary-school teachers. This article also makes thirteen pertinent suggestions concerning this program.

All this is encouraging, but at the same time the picture is not so rosy when one realizes that definite training in the selection and use of visual aids is given in only a hundred or so out of 1,200 teacher training institutions in the United States. Only one state, Pennsylvania, requires its teachers to take a course in this field.

[1] Fannie W. Dunn and Etta Schneider report that "Forty-five books are already available on visual education and educational films, and at least forty-four on educational implications of the theatrical film." Their penetrating article, The Literature in Visual Education, Its Strengths and Weaknesses, which makes a strong plea for the critical analysis of the values claimed for visual education, will be found in *Education,* vol. 58, pp. 454–459, April, 1938. See also the footnote reference to the summary of the literature on motion pictures on p. 39.

[2] *Educational Screen,* 64 E. Lake St., Chicago, a magazine "devoted exclusively to the audio-visual idea in education," is now in its nineteenth year. *Visual Review* is published annually in February by the Society for Visual Education, Inc., 100 E. Ohio St., Chicago. "Sight and Sound" is a sizable monthly section of *Scholastic,* 250 East 43d St., New York.

[3] A national organization for the promotion of the use of visual aids was formed in 1915, but it soon went out of existence. It was followed in a few years by the National Academy of Visual Instruction which later merged with the Visual Instruction Department of the National Education Association.

[4] Charles F. Hoban reported fifty-seven researches done between 1915 and 1934. The Office of Education of the U. S. Department of the Interior added forty-six more for the years 1934–1936.

[5] In 1936 approximately 400 schools and systems in the United States employed full-time and part-time directors of visual instruction.

ties have loan libraries. Several state departments of education have organized and established loan services, as have also a number of other state and federal departments, bureaus, and divisions, as well as public and private, local and national museums, galleries, and libraries, several of which offer training courses for teachers.[1] Even the League Institute of Cinematography (now housed in the former kaiser's palace in Rome) promotes conferences, encourages research, coordinates world-wide activities, and publishes a monthly magazine, *Intercine*, on the educational use of motion pictures.

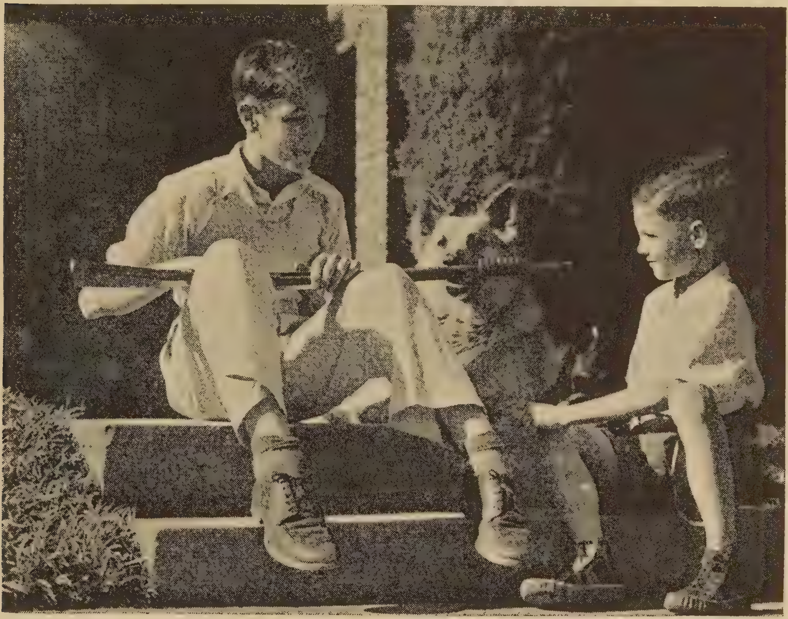

Fig. 3.—Do you suppose a boy or girl could look at this picture and not instantly understand the lesson it teaches? (*Courtesy of American Red Cross.*)

The extent to which one type of audio-visual aid has developed recently in the schools may be seen from these illustrative data:[2] the supply of sound film doubled in 1930, 1931, and 1932; in 1929–1930 no 16-mm. films were being used in the Buffalo schools and in 1937, 14,605 were shown; in September, 1930, the Rochester schools distributed an average of five films per day, and in 1939 the average daily distribution was approximately fifty films per day.

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[1] The number of these services is indicated by the fact that *Pamphlet* 80 of the Office of Education, entitled "Sources of Visual Aids and Equipment for Instructional Use in Schools, a 44-page booklet published in 1937, includes literally hundreds of these sources. The Association of School Film Libraries was organized in 1938. It issues catalogues and monthly news letters, and promotes both the visual and the sound fields. See p. 373.

[2] The American Council of Education, in its publication, "The Motion Picture in Education," Series II, vol. 1, April, 1937, judges "The status of films in educa-

The following reports from two large systems, Cleveland and Detroit, will indicate the extent to which the audio-visual program has been developed in the schools of these cities.

In October, 1938, William M. Gregory, who for a number of years has been in charge of the Educational Museum, reported the following material available for use in the Cleveland public schools.

8,769 sets of lantern slides.
2,214 sets of mounted pictures.
1,036 charts.
1,604 exhibits.
1,040 silent films.
250 sound films.
40 strip films.
96 regular 16-mm. projectors.
175 long loan projectors.
48 screens.

In a letter to the writers, dated Feb. 1, 1939, W. W. Whitinghill, Director of the Department of Visual and Radio Education of the Detroit public schools, stated that the following was standard equipment for the various types of schools indicated.

Elementary Schools

1 classroom motion-picture projector (16-mm. silent or sound).
1 stereopticon.
1 combination slide opaque projector.
1 translucent screen.
3 radios (or more).
1 phonograph (or more).
3 classroom screens.
1 auditorium screen.

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tion" by means of seven indices: (1) the quantity of projection equipment in the public schools; (2) the production activities of the schools; (3) the commercial production of films for education; (4) the quantity of films owned by schools and school districts; (5) the growth of circulating film libraries; (6) the number of districts employing full-time and part-time directors of visual instruction; and (7) the extent of teacher training in the use of motion pictures and other materials.

INTERMEDIATE SCHOOLS

1 sound motion-picture projector (16-mm. professional) for auditorium.
1 classroom motion-picture projector (16-mm. silent or sound).
2 stereopticons.
2 combination slide opaque projectors.
2 translucent screens.
3 radios (or more).
1 phonograph (or more).
2 floodlights.
1 spotlight.
5 classroom screens.
1 auditorium screen.
Centralized public-address equipment.
Portable public-address equipment.

HIGH SCHOOLS

1 sound motion-picture projector (16-mm. professional) for auditorium.
2 classroom motion-picture projectors (16-mm. silent or sound).
4 stereopticons.
2 combination slide opaque projectors.
2 translucent screens.
3 radios (or more).
1 phonograph (or more).
4 floodlights.
1 spotlight.
5 classroom screens.
1 auditorium screen.
Centralized public-address equipment.
Portable public-address equipment.

A recent survey of 8,806 schools and school systems, conducted by the Office of Education and the American Council on Education, showed 37,671 picture-projection devices, about 40,000 reels of school-owned film (in addition to those distributed by some 700 educational, commercial, and industrial concerns and agencies), 11,501 radio receiving sets, about 1,000 centralized sound systems, approximately 750,000 phonograph records, and more than 3,000,000 slides.[1] According to Howard W. Oxley, Director of CCC Camp Education, in September, 1934, 2,668 films were shown to a total of 163,699 men, and in February, 1938, 5,348 films were shown to a total of 405,834 men; and the

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[1] Koon, C. M., and A. W. Noble, "National Visual Education Directory," The National Council on Education, Washington, D. C., 1936.

CCC enrollment strength was smaller in the latter period, 277,704 to 270,323.[1]

From this brief discussion it will be seen that modern audio-visual instruction is not a fad or a frill but a most significant educational development. On the other hand, certainly, despite its phenomenal growth, it is not yet fully developed. A great deal of investigational experimentation still needs to be done in order to perfect machines, devices, and materials to make them easily available, to train their users, to educate those who must provide and maintain them, and to develop well-balanced programs for schools. And, judging by the present indications, all this will be accomplished.

Undoubtedly, too, in spite of the often heard (but quite absurd) statement, "the sound film is the acme of perfection," adaptations and improvements of this and other commonly used devices will be made and new ones will be invented. For instance, television, the talking book, and stereophonic or three-dimensional sound, have already been suggested as probable future developments in this program. And with so many competent individuals working on the problems involved, and with so much capital financing these developments, audio-visual instruction of tomorrow will undoubtedly represent a great improvement over that of today.[2] The outlook is most promising. Surely all of us who are interested in this future development really envy the boys and girls of a generation or two hence their educational opportunities.

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[1] Oxley, H. W., Visual Aids in CCC Education, *School Life*, vol. 23, pp. 362–363, June, 1938.

[2] For a good discussion of some desired and desirable developments in this field see F. Dean McClusky's article, The Immediate Needs in Visual Education, *Educational Screen*, vol. 16, pp. 213–214, 217, September, 1937.

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CHAPTER II

THE FUNCTIONS OF AUDIO-VISUAL AIDS IN LEARNING

Because the main emphasis of this volume is on the practical ways in which audio-visual aids may be effectively used, comparatively little space will be devoted to a theoretical or scientific justification of them.[1] For the average practical-minded teacher or administrator an extended and detailed support of them is not necessary. The wide use made of these devices in industry and the present great movement to capitalize them in our formal educational affairs represent sufficient evidence that they have been accepted as valuable. However, a brief, simple, and nontechnical examination of the place and contribution of these aids will serve as a pertinent background for the later detailed presentations.

THE CHANGING EMPHASIS IN FORMAL EDUCATION

There is no more reason to expect formal education to remain static than there is to expect the society of which it is a part to remain static. And it is almost trite to remark that any changes in an educational system or plan are but the result of alterations in its component parts. Some of its elements may be increasingly or decreasingly emphasized, some may be entirely eliminated, and some new elements may be originated, and developed. The significance of these elements is always relative, depending upon the conditions of adult society. A short discussion of (1) the main basic difference between the child and the adult, (2) the recent important changes in American society, and (3) the educational implications of the changes, will show the reasons for the great present interest in audio-visual instruction, and so set the stage for a consideration of the contributions of these aids.

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[1] A great deal of experimental evidence on the effectiveness of audio-visual aids will be found in Chap. X of the "Thirteenth Yearbook" of the Department of Elementary School Principals, 1934. In this chapter are summarized briefly thirty-five efforts to evaluate more or less objectively the instructional uses of the various aids. The October, 1931, and October, 1933 numbers of the *Review of Educational Research* summarize a number of evaluative articles on related teaching methods. Other pertinent reviews may be found in the current numbers of this same magazine. A Teaching Experiment with Visual Aids, by Joe Park and Ruth Stephenson, *Education*, vol. 58, pp. 498–500, April, 1938, is illustrative of studies that may be carried on by classroom teachers.

The Basic Difference between the Child and the Adult.—The greatest difference between the child and the adult is not in size, height, or weight—some children are larger, taller, and heavier than some adults. Nor is it a difference in amount of book knowledge or I.Q.—some children know more facts and have higher I.Q.'s than their parents. Generally speaking, the main difference between the child and the adult is in maturity; the adult is more mature, not always, but usually, than the child. And the adult is more mature because he has had more experience with things, people, places, events, ideas, and relationships—all of which are educative forces even though many of them are not classed as or included in "education" as usually understood. The greater the number of these experiences, the more desirable they are, and the more wholesome the reactions caused by them, the more educated or mature is the individual. In short, profitable experiences add to maturity and social intelligence.

Further, in a simple social organization there are relatively few of these experiencing opportunities, they are not particularly difficult to capitalize, and, therefore, maturity comes relatively quickly and easily. Conversely, in a highly organized and complex society there are a great many of these possibilities, and consequently maturation is slower and more labored.

How Is Education Concerned?—In colonial times the community was small, its activities and relationships were comparatively simple, and individual differences were relatively few because opportunities for their expression were relatively few, and hence the individual soon learned by firsthand experience about all of the things he needed to know in order to fit well into his particular group. He went to school, but here he learned the three R's and little else. The remainder of his "education" was supplied by the school of community life. But all of this education was simple and the individual completed it in a relatively short period of time.

As population increased, society in all its phases grew more complex, conflicting interests and demands arose because of the greater number of experiencing possibilities open to the individual, individual differences multiplied because opportunities for their expression multiplied, and "completing one's education" became a longer and more troublesome process. A great deal more social intelligence is required in a modern society than in colonial times, more in variety of elements as well as more in quantity.

But society and its school drifted apart, or, more accurately, the school drifted away from society. In an earlier day the school supplied the practical fundamentals required for successful entrance into simple community life, but later, in philosophy, materials, and methods it became self-centered and academic—more interested in "passing on the noble heritage" than in developing wholesome citizenship. No longer was it immediately practical, especially the upper part of it after the secondary school or "people's college" had appeared and developed with amazing rapidity. This institution, dominated directly and indirectly by the college through teachers, teaching, materials, entrance requirements, and the like, went off on a tangent chasing an educational will-of-the-wisp commonly known as "culture," which always has been, and still is being chased madly by most colleges.

However, as was suggested in the previous chapter, modern society is now demanding a return of the prodigal and is beginning to insist in no uncertain terms that any and all formal education for which it pays not only contribute very definitely to wholesome social living, but contribute in sufficient quantity to represent a good investment on the funds expended for it. The community is demanding that the school so train the pupil that he can understand societal relationships, appreciate his own responsibility, and discharge that responsibility in at least a somewhat creditable fashion. And it recognizes that successful training is concerned with the physical, social, and spiritual phases of life as well as the mental. To it the wholesome and contributing citizen, and not the scholar, the valedictorian, or the honor student, is the earmark of successful schooling. In short, modern society is demanding a functioning school, and this means that it have more justifiable objectives, more pertinent and relevant materials, and greater efficiency in general instructional procedures.[1]

How Is Maturity Concerned?—Obviously, in the modern world there are so many possible and essential experiences that no one could have them all in their original form. Not only are some of these impossible to experience directly, but some of them are too expensive. An individual could never "start from scratch" and acquire his experience as the race got it. Consequently the school is charged with the responsibility of selecting the most important, basic, and desirable of these experiences, of classifying them properly, and of then so setting the stage that the pupil can have them—most of them vicariously.[1]

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[1] A very pertinent reference to this discussion is William Heard Kilpatrick's, "Education for a Changing Civilization," published by The Macmillan Company, New York, 1927. The first of the three lectures included in this book considers the industrial, technological, economic, and social changes that have occurred; the second shows the implications of these for education; and the third lecture points out what the schools have already accomplished in adapting themselves to these changes.

The child, of course, has had very little experience with the world about him. And, as a learner in becoming acquainted with it, he must not only master a bewildering number of facts, concepts, and relationships, but he must also coordinate these in such a way that they represent an organized and helpful outlook instead of a miscellany of unrelated and unusable items. They must be meaningful, and they must be functional. Further, because of the magnitude of the task, he must learn to do this mastering, coordinating, and utilizing economically—with as little time and effort as possible. And just here is where audio-visual aids can give substantial assistance through their possibilities of motivation, clarification, and stimulation. As sug-

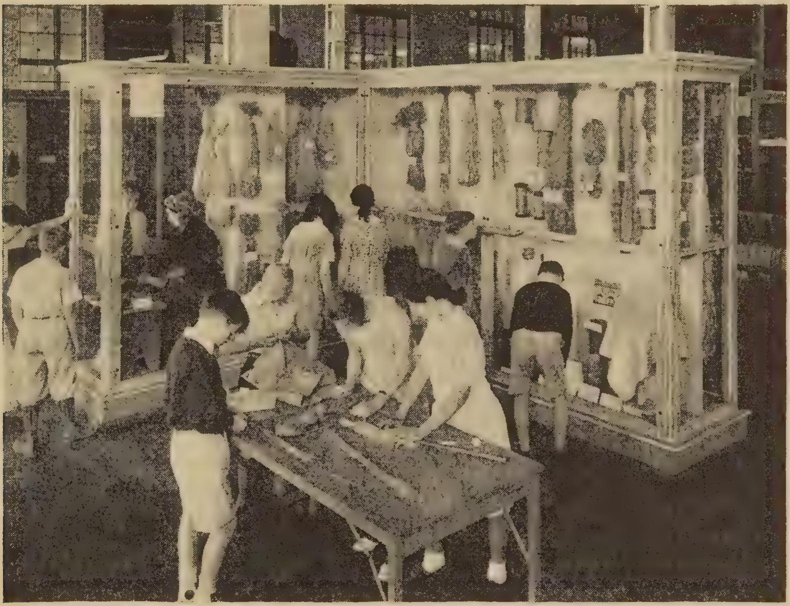

FIG. 4.—These pupils are learning from this exhibit in The Philadelphia Commercial Museum. Note, in the foreground, the provision for the closer examination and actual handling of the specimens.

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[1] John Dewey's book "Experience and Education," The Macmillan Company, New York, 1938, analyzes the viewpoints of "traditional" and "progressive" education. As suggested by the final chapter, Experience—the Means and Goal of Education, he defines education as being of, by, and for experience.

gested above, never have these aids been more necessary than they are at present.

MOTIVATION

Largely because of the close relationship of the church and the school in an early day, that very old religious philosophy—"What is good for the body is bad for the soul, and what is bad for the body is good for the soul"—has influenced our American education for many years. Up until comparatively recently this philosophy, which emphasized that the discipline accomplished through the doing of distasteful tasks was of prime importance, and which found expression in "discipline," "hard work," "spare the rod and spoil the child," "you don't like it, but it's good for you," was more or less firmly established in the minds of nearly all parents and teachers. Even today many of these individuals consider any attempt to veer away from this early philosophy a cheap, undignified, and unworthy pampering of the child.

However, due to the labors of the great thinkers who recognized the vital place interest plays in all of man's activities, and, in this country, principally to the efforts of Dewey and his interpreters, education entered a new era the slogan of which is "Discover and capitalize child interests." Naturally, this emphasis implied a recognition of individual differences because it was perfectly logical to assume, even without research and experimentation, that individuals do not have the same interests, the same degree of intensity of interest, or the same combinations of interests. So this pair—child interest and individual differences—very profoundly changed our educational organization, materials, and techniques.

1. Extrinsic Motivation.—One of the changes suggested above was a newer conception of motivation. Formerly motivation was largely extrinsic, both negative and positive.[1] In the negative type the pupil was compelled to do a particular task through punishment (or fear of it) in a variety of forms. It was not recognized that forcing a child to perform some unpleasant task results in a dissipation of his mental, emotional and, often, physical energies in rebelling against such coercion, in pretending to be interested, or in devising ways and means of doing the job just to the point of "getting by." Of course such forced learning represents a depressing and therefore a discouraging and handicapping setting.[2]

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[1] Chapter XIII of McKown's "Character Education," McGraw-Hill Book Company, Inc., New York, 1935, is an evaluative discussion of extrinsic and intrinsic motivation. See also H. B. Wilson, and G. M. Wilson, "The Motivation of School Work," Houghton Mifflin Company, Boston, 1921.

[2] F. J. Keller, in "Day Schools for Young Workers," p. 76, D. Appleton-

In the positive type of extrinsic motivation the pupil was encouraged to do good schoolwork by such devices as marks, prizes, privileges, honors, recognitions, etc., and here it was not appreciated that when the pupil works with some reward in mind he is dividing his attention between the task and the prize, and moreover, he is not recognizing sufficiently that the task itself is the most important element in the picture. As in the case above, he is not practicing concentration. In this connection Hartshorne states very pertinently:

> There is increasing dissatisfaction with the reward system and less and less dependence upon it for motivation of activities. . . . Beads and coups and merit badges, dear as they are to the heart of a child, are hardly a substantial foundation for the motivation of life's purposes, and when a leader deliberately cultivates dependence upon such external awards, even though they have no intrinsic value, he helps to establish those self-seeking motives which gnaw at the vitals of our social order.[1]

Morrison, writing in this same vein on "Spurious Motivation" says, "The usual effect is at best casual, and in the majority of cases the removal of the stimulus removes the motivation as well."[2] The present trend toward the elimination of marks in curricular, and awards in extracurricular, activities shows that educators are fast losing confidence in their effectiveness as motivators.[3]

2. Intrinsic Motivation.—With the development of the psychology of learning came the "doctrine of interest" which stresses the ideas that (1) the child has vital inherent interests, and (2) it is the business of education to discover, develop, and capitalize these for beneficial ends.[4] So the modern educator deliberately attempts to make his

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Century Company, Inc., New York, 1924, places the blame for school dropouts as follows: "Children leave school for complex reasons, but far the most important one is dislike for school, and dislike for school grows out of failure of the school to capture interest either because of immediate pleasurable qualities or potential values."

[1] Hartshorne, H., "Character in Human Relations," p. 39, Charles Scribner's Sons, New York, 1932.

[2] Morrison, H., "The Practice of Teaching in the Secondary School," p. 111, University of Chicago Press, Chicago, 1931.

[3] Two references worth reading in this connection are E. L. Thorndike's investigation-reporting monograph, "An Experimental Study of Awards," Teachers College, Columbia University, New York, 1934, and Carol Chen Shu-Kuei's descriptive doctoral dissertation (the most complete study made of the use of these devices), "Honors and Awards in American High Schools," The Hillside Press, New York, 1933.

[4] The classic among the discussions of interest and effort is John Dewey's monograph, "Interest and Effort in Education," published in 1913 by Houghton Mifflin Company, Boston. All of it is pertinent to this section.

school an intriguing setting, a place where the pupil will be wholesomely happy—and he does not do this in any cheap or pampering manner, but in a dignified way and on a high plane. He provides artistic buildings and grounds, curricular and extracurricular programs varied enough to appeal to about all types and degrees of interest, and instructional materials and techniques that are useful and natural rather than academic and artificial. In this setting motivation is intrinsic, not extrinsic. The pupil works, not to avoid punishment or for medals and glory, but for the personal satisfactions that come with accomplishment.[1] He will voluntarily spend hours and hours in working on some project—an airplane model, a stamp collection, an original poem, or a debate, or in practicing music, basketball, parliamentary procedure or dramatics, all because the activity intrigues him. He is spurred by an inner drive toward the achievement of ends within his own experience.

A worthy motive is an inducer, an inciter, or an impeller, and it is always based on interest. An interest does not necessarily result in a motive, but it is the starting point. Through aggressiveness toward attainment interest develops into a motive. This point is very important. Interest is not an end in itself, but rather a most important means to that ultimate end of growth and development. By creating a proper mental attitude or mind-set, interest guarantees attention and so paves the way for "activity leading to further activity." If it does not result in this, it represents only a temporary diversion, a sort of entertainment. Interest developed to its highest degree spells reflective thinking.

Curiosity is the most basic form of interest; in fact, it has been called "the vestibule of interest." Its importance may be seen from four brief evaluations. Centuries ago Plato stated, "Curiosity is the mother of all knowledge," and still later John Locke expressed the same idea in these words: "Curiosity in children Nature has provided to remove the ignorance they were born with." According to Kirkpatrick, "Curiosity in some form is daily and hourly a factor in human action and thought. . . . Curiosity, like play, may be the stimulus to an immense amount of what would otherwise be drudgery."[2] When curiosity becomes speculative, that is, when it begins to ponder relationships and ask the question "Why?", it becomes, as Charles H. Parkhurst happily defines it, "thought on its entering edge." Consequently, it is not to the credit of the traditional school that far too often it rebuffs and smothers the child's perfectly normal, natural, and desirable curiosity. And little wonder that such a school requires a most unusual array of devices to stimulate the pupil's attention.

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[1] One of William Penn's favorite quotations was, "He that does good for good's sake seeks neither praise nor reward, though sure of both at last."

[2] KIRKPATRICK, E. A., "Fundamentals of Child Study," pp. 192, 201, The Macmillan Company, New York, 1917.

Just How Are Audio-visual Aids Concerned?—Quite obviously sensory aids captivate interest, and they do this in several ways or for several reasons, the most important of which are the following:

These Aids Are Usually Novel.—Sensory aids usually represent a "rest" from the traditional activities of the school—such as reading, computing, drawing, writing, reciting, or listening—that the pupil has been doing. When using them he is experiencing something different, and variety is always attractive to the child as well as to the adult.

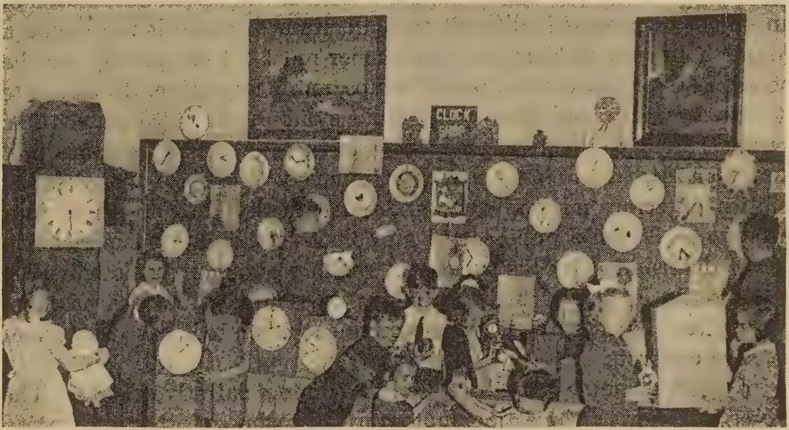

Fig. 5.—Time became more meaningful to these Hamburg, New York, pupils as they made the necessary direct study and produced their own clocks.

Sensory Aids Allow Some Freedom from the Formal Restrictions of the Traditional Recitation.—While using sensory aids the pupils may move about, talk, laugh, question, comment upon, and in other ways act in a natural manner as they do outside the classroom. The teacher's attitude is not one of compulsion, "now-here-is-what-you-must-do," but rather of a friendly and cooperative "let's-look-at-these" type. This conducive atmosphere helps to focus attention unhindered by undesirable emotional reactions. A quotation from Lowth is pertinent:

> Schoolwork is motivated when pupils work because they want to and not because the teacher asks them to do something . . . We need to realize that the best work in the world today is really not done under compulsion,

> but rather from an inner impulse born of genuine interest, either immediate or remote. We cannot think of men like Edison or Lloyd-George or Ford as being driven to their tasks. They work because they love to work, because they have great purposes to realize and goals to reach. . . . Their work is the highest type of motivation. . . . The work of the school should be based on the needs of the children and appeal to and utilize their experiences, if it is to be well-motivated, interesting, and therefore successful.[1]

Sensory Aids Are Easy to Understand and Master because They Are Concrete.—If mastery is immediate, the pupil receives a genuine thrill of accomplishment and is thereby encouraged, but if it is delayed, his interest and attention tend to be discouraged. A verbal description of an object or process is difficult to understand because it represents a roundabout way of learning; the teacher must (1) completely see the object as to proper details, relationships, and perspective, (2) translate it into accurate and comprehendable symbols, and (3) pass these symbols along to the pupils, and they, in turn, (4) must then interpret and translate them back again. Obviously there are many possibilities of error, misemphasis, and misunderstanding in these four processes. When a pupil senses an object firsthand, his experiencing is not determined by his success in reading about or in listening to, nor by the extent of his vocabulary of symbols. He learns more rapidly and his learning is more permanent when it is based on direct sensory contacts.

A good example may be found in commercial advertising. The advertiser shows an arresting photograph, drawing, or other illustration (often a beautiful and more or less scantily clad young woman) which is easily mastered. Once his attention is caught, it is easy for the viewer to read at least some of the text of the advertisement. Imagine how unintriguing this same advertisement would be if it consisted only of textual material.

Sensory Aids Cause the Child Immediately to Focus His Entire Attention on Them.—One cannot be too certain that while a child is reading, computing, writing, listening, or doing other traditional school tasks he is giving 100 per cent attention. He may be giving pretended attention. Physically he may be going through the motions while mentally he may be wool gathering. Suzzallo says,

> The parent and the attendance officer . . . can guarantee only one thing—the physical presence of the child at school. It is left to the teacher to insure his mental attendance by a sound appeal to his active interest. . . .

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[1] Lowth, F. J., "Everyday Problems of the Country Teacher," p. 454, The Macmillan Company, New York, 1927.

It is altogether possible for the child to be present physically, yet absent mentally.[1]

When a pupil is really experiencing a sensory aid his attention is so intense that other things are excluded from his mind. He cannot successfully look at a motion picture, examine an object, operate a working model, or use a stereoscope and think about something else at the same time.

Many of the Aids Provide the Child with Opportunities to Manipulate. Both children and adults are manipulators by original nature. All of us like to get our hands on novel and interesting objects because we all crave firsthand experience. We all have the "let-me-try-it" feeling. Thorndike has pointed out that although the child enjoys seeing his blocks tumble he gets more pleasure out of knocking them down himself. Undoubtedly a great part of this manipulative trait is due to a desire for mastery and ownership, at least temporary. In short, an opportunity to touch, feel, heft, handle, or operate a model, specimen, picture, map, stereograph, or other aid gives an added appeal. A higher development of this trait is the manipulation of ideas and concepts. All types of manipulatory activity represent participation or self-activity and this is always interesting.

Sensory Aids Satisfy the Immediate Curiosity Caused by Them.— Although a child's curiosity about an aid may be only temporary, yet even this curiosity is highly important because it is a starting point. An aid fits nicely into the hole or lack in the setting which the pupil has recognized. In the words of Wilson, "The child's work is motivated whenever he sees a real use in it—whenever it satisfies some need he feels, provides some value he wants, supplies some control he wishes to possess, secures some desired end, or helps him to accomplish any definite goal."[2] The logical implication is that the teacher must prepare the setting so that the pupil realizes a lack which she will later fill. In such a case the ultimate experiencing through the aid is all the more rich, meaningful, and satisfying to the pupil because of the anticipation which the teacher has developed in him.

An Aid Makes an Appeal Because It Does Not Satisfy Completely.— This statement may appear to be paradoxical in the light of the above discussion but it is true nevertheless. The pupil sees new items in a photograph, new relationships in a specimen, new possibilities in a model, or new objects or processes on a trip, and these bring new questions, problems, and implications and so deepen and widen his interest. The more he sees the more he wants to see. As was suggested previously, and as will be discussed more in detail later in the chapter, this stimulation to additional interest and activity represents a most important function of sensory aids.

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[1] Editor's Introduction to J. Dewey, "Interest and Effort in Education," p. viii, Houghton Mifflin Company, Boston, 1913.

[2] Wilson and Wilson, *op. cit.* p. 15.

In conclusion, then, modern educational theory recognizes the extreme importance of pupil interest. Quoting Thorndike again, "The problem of interest in teaching is not whether the children shall learn with interest or without it; they never learn without it; but what kind of interest it shall be; and from what the interest shall be derived."[1] Audio-visual aids, wisely selected and intelligently used, arouse and develop intense and beneficial interest and so motivate the pupil's learning. And properly motivated learning means improved attitudes, permanency of impressions, enriched experience, and, ultimately, more wholesome living.

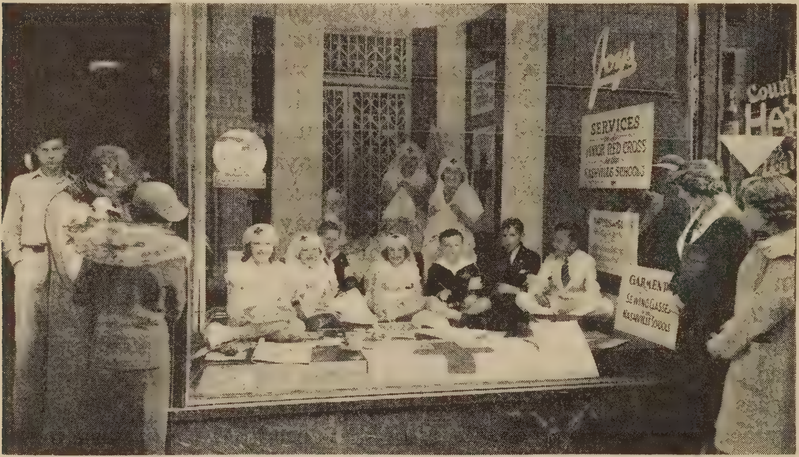

FIG. 6.—A striking example of visualization—a "live" store window by the pupils of Robertson Academy, Nashville. (*Courtesy of American Junior Red Cross.*)

CLARIFICATION

Intellectual activity depends, directly or indirectly, upon experiences which come through the senses because these channels represent the only contacts between the individual and the world about him. The internal reactions, even the higher types of cerebration often designated by the general term "original thinking," and including such mental activities as concentration, reflection, conception, imagination, association, discrimination and recollection have their basis in sensory experiences because the mind must have something to think about or play with; like the stomach, it works on what it is fed. And this feeding comes through the senses.

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[1] THORNDIKE, E. L., "Principles of Teaching," p. 54, A. G. Seiler, New York, 1911.

The raw material for mental activity may come from three types of sources: direct sensory experience with the original item—a fruit, landscape, or locomotive; direct sensory experience with representations or reproductions of the original item—a photograph, model, or drawing: and symbolic representations such as oral and written descriptions. All three of these sources are necessary. However, each has its particular specialized function and should be capitalized accordingly. Attempting to make all of them serve in the same setting or in the same way would be as stupid as attempting to drive a nail, saw a board, or turn down a screw with the same tool—a hammer, a saw, or a screw driver. A comparative description of the contribution of each will help to clarify its function and so help to show the place of audio-visual aid. Because of its establishment in traditional educational procedures, the third type, symbolic representation, will be discussed first.

Symbolic Representation.—Under certain conditions and in certain settings, symbolic representation or verbalism—the expressing or conveying of ideas through oral or written language—is very helpful and economical. A great deal of meaning can be crowded into a single short sentence. And the one basic element that determines whether or not verbalism is economical is the extent of the commonness of the knowledge or experience of the conveyer and the conveyee. A scientist might be able to describe the theory of the fourth dimension very accurately and still not be able to make himself understood because his hearers lacked sufficient information, insight, or background to comprehend it. If his hearers have this ability, the scientist's description would represent a very direct, accurate, and economical method of explaining the theory to them.

On the contrary, under certain other conditions and settings verbalism is very confusing and uneconomical. A great many sentences may be required to express clearly a single concept or idea. As was pointed out in the previous section of this chapter, verbalism is cumbersome because the teacher must translate the original item accurately into symbols and pass these along to the pupils who then must retranslate them back into the original image. These processes provide many opportunities for error, misemphasis, misinterpretation, and misunderstanding. Consider how difficult it would be for the average individual to get an idea of a minaret, the operation of some mechanical device, the shape and size of the various states of the Union, or the general details of colonial dishes, through hearing a discussion of them. As Weber states, "Verbalism is at best an indirect method of presentation. A great deal of loss is bound to occur."[1] Further, as suggested above, the one basic element that determines whether or not verbalism is uneconomical is the extent of the commonness of the information, insight, and background of the conveyer and the conveyee. Hoban points out the importance of this apperceptive mass in these words: "No word of mouth or printed page can have meaning to an individual except as he has within his experience the necessary sense perceptions which will serve as a basis for interpreting it."[2] Imagine a teacher, for instance, verbally attempting to give her pupils an idea of an animal with which they are not familiar. She would have to describe its characteristics—shape, size, height, weight, covering, color, head, legs, fins, wings, tail, ears, teeth—and this description would have to be made on the basis of the characteristics of animals with which the pupils were familiar. And too, they would have to understand the meaning of these various characteristics—legs, tail, teeth, color, etc.

It is quite likely that the reader of this book cannot define, describe, or illustrate these words, or at least some of them: "thrips," "quirister," "vadose," "xiphiplaster," and "nidget." His inability to understand them is based on his lack of previous experience with these symbols. And even if he has had some experience and as a result has some idea of nidget, say, he might still be in the dark because of a lack of sufficient experience. His understanding of nidget as used in a sentence would depend on his comprehension of its various meanings —an idiot, a type of horse hoe, a tool, or working with this tool (and each of these in turn would have to be understood)—and the context of the sentence. "Learning," says Dewey, "involves not only a knowledge of things but also the meaning of things. Mere symbolism learning is useless verbalism. The words of the textbook are not ideas until they have been transformed into concepts through real or vicarious experiences which are consequently of primary importance." In "My Education Creed" Dewey stresses about this same idea in these words:

> The image is the greatest instrument of instruction. What the child gets out of any subject presented to him is simply the images which he himself

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[1] Weber, J. J., "Comparative Effectiveness of Some Visual Aids in Seventh Grade Instruction," p. 8, Educational Screen, Inc., Chicago, 1922.

[2] Hoban, C. F., "Visual Education and the School Journey," *Pennsylvania Educational Monograph*, Vol. 1, No. 6, p. 7, Department of Public Instruction, Harrisburg, Pa., 1927

forms with regard to it. If nine-tenths of the energy at present was spent in seeing to it that the child was forming proper images, the work of instruction would be infinitely facilitated.

The traditional methods of teaching are for the teacher to (1) "tell" the lesson and later test the pupils to see whether they "learned" it, and (2) assign a lesson and then test by having the pupil recite it. The results of these two methods are what might be expected. In the first method it is easy for the teacher, who has probably taught the material many times and who knows it well, to assume that the pupils get it more easily and quickly than they actually do; and if a later test proves otherwise, she is quick to cry "unprepared pupils," "low I.Q.," "lack of industry," and other popular "justifications." And, further, in all such telling there is a great loss because of the necessity for frequent and uneconomical explainings and re-explainings.

Both of these methods of teaching, but more particularly the second in which a pupil learns his lesson and gets ready for the recitation, are usually more or less delusory in another way. It is easy for the teacher naively to assume that because the pupil recites his lesson satisfactorily he thereby proves that he has mastered it—that it is meaningful to him. We all know very well that many a perfect recitation is made which means to the reciters nothing more than a mouthing of the symbols. And probably all of us while in school "passed," with the help of good memories and artificial repetitions, courses about which we then knew and now know no more than the proverbial rabbit. Verbalism may not only represent handicapped and uneconomical learning, but it may also be responsible for mislearning and even downright bluff.

In summary, verbalism is an important method of imparting information or conveying ideas; we could not live in a modern society without it. However, it may be either economical or uneconomical depending largely on the experience and the apperceptive mass of the learner. But in any case it is an indirect method of instruction because it is symbolic only. In traditional teaching verbalism has been greatly overemphasized, often with very unsatisfactory, and sometimes with downright deleterious, results.

Direct Experience with the Original Item.—Because the individual learns first through his sensory channels, such learning is usually the most natural and consequently the easiest. When the pupil sees, hears, touches, tastes, and smells, his experiences are direct, concrete, and more or less permanent. The difficulty a teacher would have in effectively describing a new animal to her pupils was pointed out in the previous section. How much more easily and accurately could they learn to comprehend it by actually seeing it. And how much more readily and successfully could they comprehend the essential elements or characters of a geometrical figure, scenic beauty, a famous picture, and an industrial process, by actually experiencing them. In such instances the impressions are firsthand, clear-cut, accurate, and usually meaningful, rather than secondhand, vague, inaccurate, and meaningless as they are likely to be in verbal descriptions, and therefore fewer misunderstandings and misinterpretations will occur.

Sensory experiences are not only essential to present better understanding but the extent and success of the pupil's future learning and mental activity also depend on them. Even in our conversation we continually use some form of visualizing. Our similes, "black as coal," "white as snow," "strong as a horse," "like a flash," help to clarify or emphasize the idea we are attempting to convey by utilizing the previous experience of the listener. Therefore, it is logical to assume that the greater the number and variety of these experiences, the better able the pupil will be to comprehend and interpret other new ideas as they are presented to him later. All of this means that the school must furnish as many opportunities as possible for direct sensing in order to widen the pupil's environment. Some of the illustrative items, objects, and specimens can be brought into the classroom, others can be made available through school and community exhibits, and still others through trips to various local and distant points of interest. The possibilities for direct contact are not only numerous but also varied in any school and community.

FIG. 7.—A trip to the airport to interview a well-known transcontinental air-line stewardess. (*Courtesy of Burbank Public Schools.*)

Direct Sensory Experience with Representations or Reproductions of the Original Item.—Although usually firsthand is the most educative type of experience, sometimes it is not, and often, too, it is neither desirable nor possible for the pupil to obtain it.

It is certainly not desirable for the pupil to obtain firsthand experience with disease, accidents, and bad social and physical habits because such experience is too expensive. Yet it is desirable that he have a vicarious experience with them so that he will be able to recognize their characteristics, operation or action, and effects. The wide use now made of photographs, drawings, diagrams, manikins, and posters, as well, of course, as verbal textual material, in health and safety drives and campaigns helps to provide these vicarious experiences.

In the second place, firsthand experiences are not always possible. The average pupil cannot personally see the pyramids, the Eskimos in their natural environment, marine life on the ocean floor, or a distant volcano, cave, building, castle, or battlefield. It would be too expensive in both time and money to arrange it so that he could have direct contacts with these and other inaccessible objects and phenomena. In such instances, although experience with representations may not be so valuable as direct experience, it is helpful because it is based on more or less faithful reproductions of these items. Photographs, drawings, working models, and replicas may lack some of the impressiveness of the originals, yet they serve adequately, and some of them, such as stereographs and sound films, are surprisingly effective. Too, these reproductions are not only convenient to bring into the classroom, but are relatively inexpensive.

In the third place, there are situations, objects, or types of phenomena in which a reproduction is even better for instructional purposes than the original. The original may be (1) too complex, (2) too big, (3) too small, (4) too fast, (5) too slow, (6) too inaudible, or (7) too untimely to be successfully experienced firsthand. Illustrations of these, given in the order suggested above, will clarify this point and show how the appropriate representations can function.

A complicated machine in operation is no doubt intriguing because it is spectacular, but watching it may give the individual no idea whatever of how it works, of the unseen detailed parts, processes, and relationships. In such an instance a simplified or "cutaway" working model can be effectively used to explain the principles and operation of the real machine.

A group of buildings, a watershed, or a city may be so extensive or large that the pupil cannot see all its parts and relationships in their proper perspective. Here a replica, a relief map, or a diagram can be used successfully to present the original item.

Sketches, enlarged photographs, microphotographs, slides, and motion pictures can be used to show very small objects that cannot be seen satisfactorily and adequately by the unaided eye.

Phenomena which occur too fast for the eye to follow, such as the flight of a bullet, or the bending of the surface of water when a pebble is dropped into it, can be reproduced clearly by slow-motion photography. And, conversely, phenomena which occur very slowly, such as the growth of a plant, or the opening of a flower, can be "speeded up" and shown easily by means of time-lapse photography.

Inaudible sounds can be picked up by the microphone and reproduced so that they can be heard. Another good illustration of a setting in which the reproduction may be better for instructional purposes than the original is in music. Radio broadcasts are popular in school music programs and undoubtedly they have stimulated beneficially the study of this subject. However, in teaching pupils to recognize and appreciate the various elements involved, listening to a locally played transcription of a number can be much more educative than listening to the number as it is originally played by the artist or music organization. The original rendition is given once. The transcript can be played many times, it can be played slow or fast, and it can be stopped at any point for replaying or for discussion by the teacher and her group. In one playing the members of the group may listen to the selection as a whole; in another, they may listen for the theme; in another, for the harmony; in another, for the contributions of the various instruments; and in other playings they may note the accent, tempo, phrasing, and other elements which go to compose the number. The pupil could certainly never listen understandingly and successfully for all these items in the single first rendition. It is true that the reproduction may lack the attractiveness of the original, but it is just as true that the reproduction offers him far more music-learning opportunities than the single original rendition alone would provide.

Some phenomena, such as a snowstorm, eclipse, or growing crop are seasonal, while others, such as a flood or fire occur at irregular and unpredictable times. The possibilities of actual and timely pupil experience with both of these types are remote. However, the pupil can, *through pictorial representation*, experience them at any time.

The Relationship of Verbal and Audio-visual Instruction.—Although the point may be clear from the discussions of this and the previous chapter, yet it can profitably be emphasized that visual instruction is not something distinct from general instructional activity, but rather an integral part of it. Visualizing cannot be separated from verbalizing. Showing an aid is not the same as using it. One could not merely show a picture, say of an unknown animal, allow the pupils to look at it, and then dismiss the group and assume that the pupils had learned all that they needed or wanted to know about it. The picture does not tell the whole story. Looking at it must be supplemented by talking about it. Such questions as, "Where does it live?" "What are its habits?" "What and how does it eat?" and "Is it harmful or beneficial?" will immediately arise and have to be answered by verbal discussion or still other illustrative material, which in turn will require some verbal clarification. As Merton points out, almost any picture contains elements—size, temperature, motion, distance, depth, color, odor, speed, weight, etc.—which are abstractions for the pupil.[1] Even such aids as maps, charts, cartoons, and graphs are also more or less abstract presentations.

In short, the relationships of verbalism and visualizing are reciprocal; each supplements and reinforces the other. Experience in itself is not necessarily meaningful, but instruction helps to make it so; and likewise, instruction in itself is not necessarily meaningful, but experience helps to make it so. Further, verbal instruction is not always uneconomical, nor is audio-visual instruction always economical. Each has its own particular functions, and each may be, and undoubtedly is, often misused.

Further, it is proper to emphasize again that verbalism is not always "difficult," nor is visualization always "easy." As was suggested above, a picture, graph, or map, or a phonograph or radio presentation may be abstract, and consequently, be very difficult for the pupil to understand and appreciate. As a matter of fact, an audio or visual representation will always be an abstraction until the pupil has the necessary background of experience and understanding with which to interpret it. These devices are aids to learning, they are not mystical "instantaneous teachers." There is no magic in them.

STIMULATION

Psychology has pointed out the absurdity of the statement of the old man who, when asked what he did all day, replied, "Well, sometimes I sits and thinks, and then sometimes I just sits." As a matter of fact, he never "just sat" without some form of mental activity going on, unless he was asleep, and even then his mind, or a section of it, might have been working a part of the time. During one's waking hours his mind is always on the go. The type or quality of its activity may range all the way from idle and scattered wanderings to the deepest of reflective concentration, but the mind is always busy. Naturally, the more control the individual has over it, and the more he can exclude extraneous reflections, organizing and focusing attention on the problem at hand, the more clearly he thinks.

What is true of the adult is also true of the child. His mind is always working, even if not on the lesson before him, but on one or a number of other things. It is restless and incapable of prolonged

[1] See the bibliography for the reference to this excellent article.

focusing. And, in one way, at least, this may be a blessing in disguise. Mental restlessness probably guarantees a breadth of interest that would not be possible if the child could focus his attention unreservedly for a considerable length of time. The intelligent teacher knows these facts and not only provides for rest or "letdown" periods but also utilizes appropriate and varied devices to captivate the wandering mind.

One of the weaknesses of traditional schoolteaching is its failure to tie up more closely the various lessons, projects, and tasks. Many of them lack continuity. The pupil prepares and recites his lesson, and then tends to dismiss it from his mind. The procedures of assigning lessons, testing (either in the recitation or in the formal examination), and giving a mark for the work, encourages the further development of this attitude, often expressed by the statement, "I had that course." The implication is that the course was taken and passed and could therefore be forgotten. Credit for it was in the "bank." A good teacher attempts to stimulate the pupil to further mental activity about the elements and possibilities and uses of a particular lesson, but this is difficult to do, especially with materials that are academic and therefore relatively unrelated to the pupil's life. Even those that are closely, or should be closely, related become

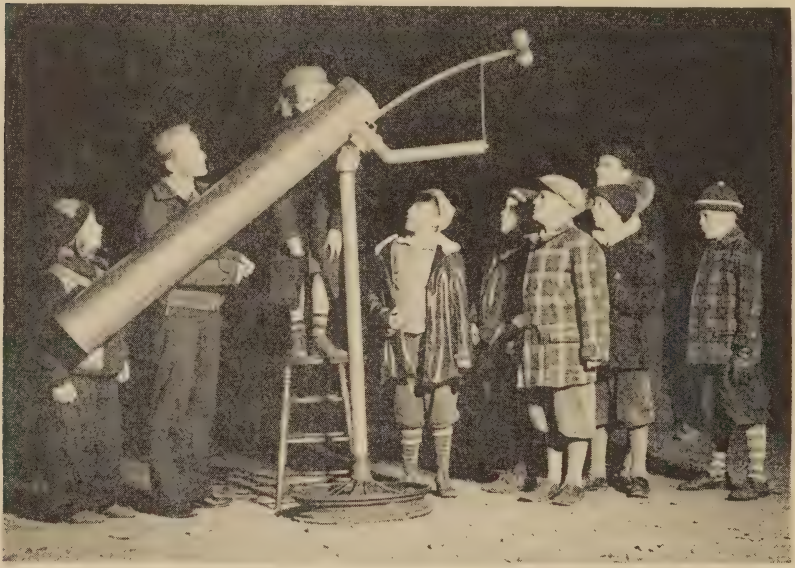

FIG. 8.—These pupils are visualizing the craters on the moon through a home-made telescope.

merely formal academic stunts done to please the teacher thereby winning "pay," if the appropriate personal applications are not made. And often they are not because the essential curiosities are not aroused.

Curiosity is natural, and therefore can be "practiced," and the more it is practiced the greater and the more insatiable it becomes; the more the pupil sees the more he wants to see. As was pointed out in the section on motivation, their curiosity arousing qualities represent one of the advantages of visual aids. It is true also in verbal instruction that the more the pupil really "sees"—senses and understands—the more he wants to see, but the disadvantage of this type of instruction is that its formal and handicapping procedures often restrict and limit his seeing. A device or technique which does not arouse curiosity and subsequent intellectual or other activity can hardly be called educational. Even sensory experience, while basic, is but the starting point of learning; if further experience does not emerge naturally out of it, it represents largely a temporary diversion.

Audio-visual aids are effective in stimulating mental activity because, usually at least, they are interesting and relatively easy to master. In their use the pupil's natural curiosity is not stifled, as it is so frequently in formal verbalized work. Instead, it is encouraged; the teacher recognizes that this is one of the important objectives of the use of these devices. Hence, both the teacher and her pupil are likely to have quite different attitudes towards even the same material when it is presented verbally and when it is presented in a more direct and concrete form. The average pupil hesitates to ask questions in the formal recitation for fear of showing his ignorance and so losing the respect of his teacher and his fellows, but in the more informal setting of visualized instruction he feels freer because this setting is more like an out-of-school situation in which his queries come easily and naturally. So, because both the teacher's and the pupil's attitudes are favorable, it is easy to promote the further development of this questioning mind-set.

A well-capitalized sensory aid satisfies a definite lack which the pupil feels, but at the same time it causes him to feel new lacks. Imagine the many questions—hows, whys, wheres, and whens—that arise in the pupils' minds while they are examining even the simplest object or specimen, a leaf, rock, cow's horn, piece of cloth, or bit of glass, and how, as a result, such an item becomes the stimulus for an astonishing array of possibilities for further sensing and learning. Out of the pupil's rather informal, easy, and interesting experience come not only new information but new questions, new problems, new implications, new applications, and new possibilities, each of which in turn leads to other new ones.[1] Its effect is really the oft-quoted "activity leading to further activity" idea. Out of its use, then, grows additional cerebration—reflecting, associating, imagining, evaluating, and organizing.

Further, the intelligent teacher does not merely wait for this additional interest to appear, but instead she very definitely works to insure that it comes. For instance, the wise trip leader not only makes certain that the children intelligently and satisfactorily see what they came to see, but she also so arranges the details of the trip that they pass by other interesting objects, exhibits, offices, animals, processes, etc., in order to arouse their interest in these and thus sow the seeds for additional trips. Even in showing a photograph, slide, motion picture, model, specimen, or other aid the teacher can similarly prick the pupils' curiosity so that they will want to see more, hear more, and learn more. In this procedure the children are led, not driven, so that they will feel that they themselves have contributed. Such a feeling of participation adds to interest in the item or project.

A most important advantage of this type of learning is that it is motivated largely intrinsically; the pupil is not stimulated by fear of punishment, or desire for reward, but rather he is interested in exactly the same way in which an adult would be interested in some new concrete object or process, that is, naturally. He has little other thought than to satisfy his curiosity—to understand the thing. Once he comprehends it, he has the thrill that comes with mastery. And this thrill helps to motivate to further experience and incite to additional attempts at mastery. Audio-visual aids wisely used stimulate purposeful and vitalized self-activity, and this is much more profitable educationally than a more or less passive, and often bored, listening.

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[1] One of the best illustrations of this the author has ever seen grew out of a small smooth stone which a high-school assembly speaker held up for observation. This stone, which came from the stomach of a prehistoric monster, where it worked as a digestive assistant, was the starting point of a story that held the attention of more than 1,000 students for nearly an hour.

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CHAPTER III

PRINCIPLES UNDERLYING THE SUCCESSFUL USE OF AUDIO-VISUAL AIDS

More or less well-established principles underlie any successful or efficient process. The extent to which these principles are accepted or established depends on the amount of previous experience, both successful and unsuccessful, because they originate in and grow out of experience. The greater that experience is, the more definite are these principles.

Because some types of audio-visual aid, such as the motion picture and the radio, are new, and because of the recency of the vigorous movement to capitalize sensory aids for instructional purposes, we have had relatively little experience with them and consequently do not have a large and substantial foundation on which appropriate principles can be based. However, we have had some experience, and on the basis of this, together with pertinent reasoning, can arrive at what, at the present time at least, appear to be logical principles. Perhaps in time some of these may be eliminated, some changed, and even new ones added. The principles set forth and briefly discussed in this chapter appear to have sufficient justification for their inclusion. Perhaps some of them may appear to be trite, but they are included in order to give emphasis, show relationships, and complete the picture.

An Intelligent and Cooperative Faculty Support Should Be Developed.—It is discouraging to realize that in many schools the first step taken in the development of a program of audio-visual instruction, often because of the influence of some salesman, an address, a summer-session course, or a desire "to keep up with the Joneses" in another school or system, is to purchase a motion-picture machine, a slide projector, a radio, or some other device or material. When this is unpacked and displayed the first question asked is a pitiable, "Now what do we do?" or "How shall we use it?" Neither educative nor administrative competence is represented in this deplorable situation.

The first step in the introduction and development of a program of audio-visual instruction is the education of the teachers so that they will become intelligent and cooperative supporters of it; without this support the program will certainly fail, and such failure will handicap it for years. Here again, because this educational emphasis is relatively new in most institutions of formal education, not all teachers and administrators need be expected to be enthusiastic about or competent in it. Few of them have had appropriate training; some are fearful or skeptical, or both; and some recognize the possibilities but are inexperienced. A few may be both enthusiastic and competent. Although faculty support will probably never be either complete or completely intelligent, yet it must be substantial. A serious, sensible, and unhurried campaign of education will help to develop this support and so provide a favorable setting for the program. Several months or even an entire year may be required before the faculty is sufficiently prepared for the initiation of a program. But this period of preparation will be well spent.

This education of the faculty may be promoted by a number of devices such as (1) reviews of the literature on the subject; (2) general faculty discussions; (3) reports of practices in other schools; (4) talks by competent teachers and experts; (5) visits to other schools; and (6) demonstrations of equipment and materials. A committee, composed of those teachers who, on the basis of interest, training, and experience, are most competent, can be used to good advantage in the promotion of this necessary faculty support.

In a given school one or more of the teachers who are enthusiastic about the possibilities of the audio-visual aid program may develop it for their classes. This introductory use may prove its value and so interest other teachers in the possibilities for their own work. However, because equipment and materials are expensive, the average school administrator will hesitate to purchase very much for the use of only one or two teachers. Consequently, a better plan is probably to attempt to interest the entire faculty in it. If this is accomplished, special attention to the audio-visual program becomes a definite part of school policy and the expenditures for materials and equipment will be more easily available.

Sensory Aids Should Be Carefully Selected.[1]—A great deal of audio-visual aid material is now being produced and consequently choices will have to be made. There is as much logic in using care in the selection of these aids as there is in the selection of textbooks, seats and desks, typewriters, fuel, and other material and equipment. Perhaps even more so, especially in the case of the expensive items, because some members of the community are certain to wail about these purchases of "fads and frills"; and if poor purchases can be pointed to, these wails will carry that much more weight. Poorly selected aids will bring unfavorable criticism from teachers, pupils, and taxpayers and so handicap the program.

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[1] The pertinent literature on this topic is briefed in Part III of Dale, Dunn, Hoban, and Schneider, "Motion Pictures in Education," The H. W. Wilson Company, New York, 1938.

Only the very best of opinion should be considered in this selective process. In some schools there are teachers, supervisors, directors, department heads, and administrators who, on the basis of their training and experience, are more or less competent to give counsel. Expert opinion may also come from teachers of sensory-aid courses, experienced individuals in other schools, and from reports of investigational studies, experiments, and researches. In some instances it may be both possible and desirable for those interested to test out or try out the item being considered. In any case the selection should not be arbitrarily made.

Wherever feasible, and it should usually be so, these aids should be selected by the teachers who will use them the most. The busy principal or superintendent is, generally speaking, no more competent to select them unaided than he is to select the textbooks and other materials and equipment that the teachers need. Possibly he should be a member of the selecting committee, provided his personality and position are not allowed to become too influential. As implied above, a committee composed of those teachers most competent to choose these aids should be officially charged with this responsibility. And naturally its opinion should be respected.

Detailed information concerning the various items may come from a variety of sources, such as catalogues, announcements, advertisements, exhibits, samples, reviews, magazine articles, books, reports from other users, and salesmen. Salesmen are an excellent source provided several of them are interviewed or allowed to demonstrate. Each is interested in selling his own product but each is undoubtedly familiar with the products of other companies and therefore if it is suggested that the committee is considering these other products also, he may point out weaknesses or disadvantages of them which the group should know about. It is true, of course, that the salesman may overemphasize or inaccurately represent the product of the other company. However, the more accurate information the committee is able to obtain, the more intelligently it should be able to select products. Incidentally, the selection of a particular device by some other group or school does not necessarily prove the value of this device. Too, it is well to remember that new models, equipment, and materials are often advertised before they are ready for distribution. Blind buying is always hazardous; the committee should establish and follow the policy of seeing before purchasing. Competitive demonstrations or tryouts under identical conditions represent a good method of obtaining comparative data.

The suitability of a particular article should be judged on the basis of such questions as the following, not all of which are, of course, equally applicable to all types of aid.

1. Specifically, for what educational purposes is it designed?
2. To what extent will it probably accomplish these purposes?
3. Is it interesting? Comprehensible? Concrete? Clear? Concise? Natural?
4. Does it suggest new questions, problems, material, implications, applications?
5. Is the material that it presents reliable and authentic?
6. Is the educational element overshadowed by the dramatic or the spectacular?
7. Can it be used effectively by or for the pupils for whom it is designed?
8. Is it free from undesirable advertising or propaganda?
9. Is it easily and conveniently operated, manipulated, handled, or used?
10. Is the price reasonable? How does it compare with the price of other similar products?
11. Is it well made mechanically? Durable?
12. To what extent is it guaranteed, if this is essential?
13. Can repairs and replacements be obtained easily?
14. Is there any possibility of danger in the using of it?
15. Will it represent an attractive and respected piece of equipment?
16. Is the company that produces it reliable?

The Teacher Must Know the Specific Function of the Various Aids and How to Use Them Most Effectively.—As was pointed out in the previous chapter and as will be explained and illustrated more in detail later in connection with the discussions of the various types of aids, each device has its own particular function; it can be used more advantageously in some settings than in others. For some types of material the motion picture can be used with maximum effectuality, with others the photograph, or slide, or specimen represents a better presentational device. The use of one aid when some other would be more profitable is uneconomical. Obviously, a knowledge of the particular uses of each aid is essential to the most intelligent capitalization of it.

However, knowing the functions of the various aids and wisely selecting them for particular settings, do not represent the whole story; the teacher must be able to use them intelligently. There are certain techniques more or less established in the use of instructional aids just the same as there are in making assignments, asking questions, giving examinations, and promoting discussion, and the teacher must not only be familiar with these but also have some skill in using them properly and at the right time. Because these methods vary with the type of device used they will not be discussed here but later in connection with the presentations of the various aids.

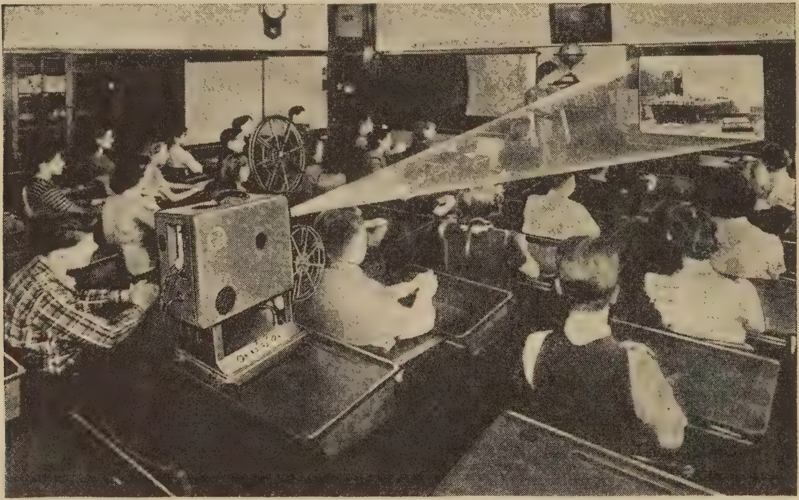

Fig. 9.—Interest is an essential element in effective learning. The motion picture, always intriguing to young people, represents one means of arousing it. (*Courtesy of The DeVry Corporation.*)

The Aid Used Should Be Appropriate to the Age and Experience of the Pupils.—An aid is an aid only if and when it really aids. And it will never aid maximally unless it is suitable to the backgrounds, abilities, interests, and needs of the pupils. As someone has pointed out, it must be suited to the physical, psychological, intellectual, and social development of the group with which it is used. If it is too difficult it will handicap ready learning; if it is too simple it will create undesirable pupil attitudes. It is entirely possible, with even the same group of pupils, for an aid to be suitable in one type of learning setting and unsuitable in another. Here again, experimentation or evaluated use by the teacher will help to determine which aids fit particular groups, and also which phases or elements of these aids are appropriate for the various types of educational settings.

The Teacher Must Ensure That the Pupils Obtain Actual Firsthand Experience with the Aids.—Because of her previous training and experience it is easy for the teacher to continue to be the talker, actor, doer, handler, and user when she teaches with instructional aids, and when she does she makes certain that at least a part of the pupils' experience is secondhand. In some instances and with some types of material this procedure may be proper, but in others it is wholly improper. Generally speaking, an aid in the hands of the teacher is not so valuable as an aid in the hands of the pupil.

In the second place, often the teacher or official overfeels his responsibility for protecting the materials and equipment of the school. Many a school librarian guards her books with such a jealous care that she gives the impression of being more interested in having them in their proper places on the shelves than in the hands of the pupils. Similarly, in many schools visual aids are little more than locked-up and somewhat inaccessible exhibits. If the teacher or her pupils face discouraging formalities or difficulties in getting the aids, their attitude certainly will not be conducive to easy learning. Naturally the aids should be protected, especially the high-priced and complicated machines and devices, but at the same time those which can be safely and effectively used by the individual pupils should be kept easily available.

An Aid Should Be Actually "Taught," Not Merely Displayed.[1]—Merely looking at a photograph, diagram, or motion picture, or listening to a phonograph record or a radio broadcast does not necessarily mean that the pupil gets the full meaning from it. Sensory aids are not mystical or magical devices through the use of which the pupil becomes instantly and completely educated. At best they are still only "aids" to instruction, they are not substitutive but supplementary; they do not represent complete educational settings in themselves. It follows therefore that the teacher should have very definite purposes in using an aid and that she lead the pupils to understand and appreciate the reasons why it is being used.

All aids are more or less abstract and some of them are considerably so. Hence they need clarification either through other aids and verbal discussion or through verbal discussion alone. Some items in them will have to be pointed out, explained, or emphasized. Always, or nearly always in the use of these aids there is a danger that the pupil may be attracted by the unusual features and, if these do not represent the main theme, so miss the point of the lesson. It is very easy, often, for "the side show to eat up the main tent." The teacher is the individual who can prevent this. And she can do it only if she actually leads the pupils, as she does in any other instructional setting, to recognize and understand essentials. One of the conclusions of the study by the Research Division of the National Education Association was, "The superior effectiveness of the teacher as contrasted with any material device was indicated repeatedly in this investigation."[1]

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[1] Of course the aid itself is not taught, only the material it represents. This use of "taught" is for purposes of contrast.

As a matter of fact, the general principles underlying the teaching of a good lesson involving the use of aids are probably not much different from those underlying the teaching of formal textual materials. A definite assignment which causes the pupils to feel an important lack and develops an anticipation of having this need satisfied, appropriate preparation by both teacher and pupils, an interesting, economical, pertinent, and applied presentation, ample opportunity for pupil participation, a good summary, and a fair test are as important in audio-visual instruction as they are in any other type of teaching procedure. And it cannot be overemphasized that pupil participation is basic to a successful lesson.

The Use of Sensory Aids Must Not Be Allowed to Develop Passive Receptivity in the Pupils.—By their very nature, sensory aids are interesting and appealing to the pupils, but herein lies a real danger, that of a confusion of mere interestingness with educativeness. This is especially possible with aids which resemble commercialized entertainment, such as the motion picture. An aid is not a device of diversion and must not be allowed to become so. The pupil must be held for definite reactions to the material presented, irrespective of the methods by which it is presented. This may be accomplished through discussions, questions, formal and informal examinations, sketching, drawing, reporting, evaluating, etc., all of which represent reactions, participation, and self-activity. The more the pupil is stimulated, the more he learns and the more his learning is facilitated.

Teacher Preparation Is Absolutely Necessary.—Probably in no type of teaching activity is previous preparation more important than in sensory instruction, because of the danger of an interested but undiscriminating experience with the aids used. The teacher must be thoroughly familiar with the device and the possibilities of its use. She must know which elements of it are important and which are unimportant; specifically, just how the aid may contribute to an understanding of the lesson being taught, as well as to related past and future lessons, and how it can be most economically and advantageously utilized. Teachers' guides are now supplied with some types of aid and the teacher may either follow these or adapt them to suit her own particular group and purposes. If no such guides are available, the teacher can develop her own, evaluating and so improving them with each using.

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[1] "Thirteenth Yearbook," p. 453, Department of Elementary School Principals, 1934.

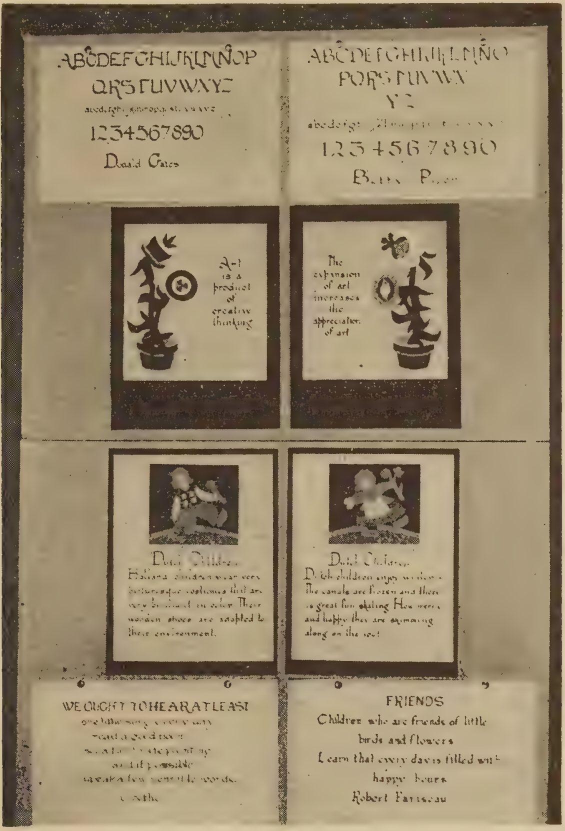
1234567890
Art is a product of creative thinking
The expansion of art increases the appreciation of art
WE OUGHT TO HEAR AT LEAST
FRIENDS
Children who are friends of little birds and flowers
Learn that every day is filled with happy hours
Robert Fariseau

FIG. 10.—An attractive bulletin board has an important place in the visual-aids program.

Adequate Pupil Preparation Is Also Necessary.—As has been suggested several times previously, the pupil must be led to feel a need or lack that the aid can assist very materially in satisfying. This felt need and the anticipation of having it satisfied make for a favorable attitude or mind-set. To illustrate: the pupils may prepare for a trip by listening to the announcement, "tomorrow we are going to the zoo," and having their coats and hats on at the proper time; or they may prepare by considering routes, time, expense, the animals to be seen, the particular characteristics, traits, size, habits, food, color, etc., of these animals, and how this information fits into the lesson being studied. In the first illustration the pupils would merely look. In the second they would look for answers to an array of very definite questions—whats, hows, wheres, whens, and whys. It is easy to see which trip would be the more profitable.

Utilizing Sensory Aids Should Represent an Economical Use of the Time of Both the Teacher and Her Pupils.—It is quite possible that although an aid may be used economically as far as immediate educational results are concerned, it may represent an uneconomical use when the whole procedure of utilizing it is considered. An inordinate amount of time and effort may be expended in getting the aid ready for use, preparing the group for its use, using it, and finally caring for it and putting it away. On more than one occasion the writer has seen a group of nervously fidgeting pupils waiting for the teacher to run around and get the aids, prepare them for use, adjust and repair machines, and do other work which, except in emergencies, was unjustifiable because it wasted the time of the pupils. Efficient planning and executing by the administrative force of the school as well as the teachers will prevent such wastes.[1]

Not Too Many Aids Should Be Used.—In the past too few aids were used in classroom teaching. However, now there is a possibility that too many may be used, especially by those teachers who are enthusiasts. This possibility is due to several causes, among them, (1) the present great interest in this field and the consequent danger of teachers' considering aids as sure panaceas for all instructional ills; (2) "quack interest"—the desire of some teachers and administrators to prove their progressiveness by a very liberal (but usually unenlightened) utilization of new devices; and (3) the ease with which these aids are now obtained.

Although an adequate and varied supply of these aids is essential, yet an indiscriminate and too free use of them, especially by those teachers who have not learned how to handle them successfully, can easily cause confusion instead of clarification. The utilization of an indiscriminate multiplicity of illustrations soon robs them of their value. Certainly not everything that is illustratable needs to be illustrated. One very pointed and pertinent illustration is worth a dozen scattered and unrelated ones, even though they are interesting.

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[1] A very spicy story of "a glorious phantasy of errors"—a demonstration of the use of homemade lantern slides and the making of photographic slides, written by Anonymous, under the title Confessions of a Visual Enthusiast will be found in *Educational Screen*, vol. 13, pp. 38–39, 52–54, February, 1934.

Here again, due to our immaturity in this field, we do not know just how many aids can be used satisfactorily, either in an entire schedule or in an individual lesson. This information will come with further experience and research. However, it is well to stress the point that a multiplicity of devices, or even the using of them, does not necessarily represent a well-balanced program.

Sensory Aids Should Be Continuously Evaluated by Those Who Use Them.—If aids and the techniques of using them are to be refined and improved they must be evaluated. Although the average teacher is not in a position to do much controlled experimenting or scientific measuring, yet she and her pupils are in a position to make subjective estimates of value. And these evaluations are beneficial because they have some basis in fact.

The teacher can evaluate on the basis of, (1) the pupils' ability to use the aids effectively; (2) pupil interest and attitudes; (3) records of participation; (4) general class atmosphere; (5) reactions of the slower pupils; (6) formal and informal tests and examinations, and (7) the general scholastic record of the group. In some settings she may even be able to carry on simple experiments. True, some of these estimates may not have the support of columns of impressive looking statistics, yet they do have a basis which causes the teacher to make them.

The teacher should, of course, also carefully evaluate her own techniques in the handling of these aids, in order to distinguish between credit or discredit that should go to herself and credit or discredit that should go to the devices. The supervisor or director of audio-visual aids, department heads, and even the administrative officers of the school are also often in a position to help with this evaluation.

The pupils, too, can estimate the effects of these aids. If the aids are designed to assist the pupils in their work, they should be the first to note their helpful effects. They are at least as close to their own needs and satisfactions as is the teacher and are probably quite as competent to judge results. These evaluations may be both written and oral. Some pupils would rather make them orally in a general discussion, and others would do a better job if they were allowed to write their reactions.

Should the older pupils also evaluate the teacher's techniques and methods? Teachers differ quite markedly on this question. Many teachers have found pupil criticism to be an excellent device for improving their work. Others shy at it, usually for one or all of three reasons or objections: (1) pupils are not competent to judge a teacher's work; (2) such estimates are valueless because the pupils are biased by their emotional attitude towards the teacher; and (3) such familiarity on the part of the pupils lowers their respect for the teacher.

Are these reasons or objections sound? In general, the authors believe not, although in some instances there may be a bit of justification for each of them. (1) The first objection is baseless, as many a teacher who has used this device can testify. The pupils are far better judges of the teacher's ability than we usually give them credit for being.[1] Why shouldn't they be? They have had several teachers

Fig. 11.—School trips not only provide opportunities for learning about local animals but also those of foreign countries. (*Courtesy of Springfield, Missouri, public schools.*)

[1] The report of the investigation of the opinions of 10,000 high-school students and 19,000 elementary-school pupils on the qualifications of the "teachers most helpful" will be enlightening to any individual who disagrees with the above statement. This report will be found in Chap. X of the "Tenth Yearbook" of the Department of Superintendence of the National Education Association, 1932.

Quite a number of other studies of such ratings have been made, from which the following comprehensive and varied selections have been taken:

Boardman, C. W.: An Analysis of Pupil Ratings of High-School Teachers, *Educational Administration and Supervision*, vol. 16, pp. 440–448, September, 1930.

Clem, O. M.: What Do Students Think about My Teaching? *School and Society*, vol. 31, pp. 96–100, January, 1930.

Hart, F. W.: "Teachers and Teaching by 10,000 High-School Seniors," The Macmillan Company, New York, 1934.

Light, U. L.: High-school Pupils Rate Teachers, *School Review*, vol. 38, pp. 28–32, and so have a basis for comparison. Too, they know when they get their work and when they do not; and they know their own difficulties and the extent to which the teacher helps them over the rough places. (2) It is true that an emotional bias toward the teacher may mean favorable or unfavorable (and often useless) comments, but even these attitudes themselves are frequently good indices of the teacher's success. Too, a favorable criticism may give the teacher support, and an unfavorable comment really be well deserved. (3) The teacher who believes that "familiarity breeds contempt" is thinking more of her position than she is of her success in filling it. If she appreciated the fact that pupil-recognition of her teaching ability would bring her more pupil-respect than authority or anything else, she would not raise this objection.

In short, the authors contend that obtaining and studying pupil reactions toward the teacher's technique in using audio-visual aids is just as logical as obtaining and studying those devices themselves. Of course, anonymously written comments are preferable to signed statements or oral discussion because the pupils will feel freer to make them and hence their reactions will tend to be more honest and sincere.

The great present emphasis on sensory aids is of comparatively recent origin, and many of these aids are new, and consequently, the conditions are most conducive to a free give-and-take between the teacher and the pupils. She is probably somewhat inexperienced in the handling, and the pupils in the using, of these aids, and therefore a close cooperation should contribute to better practice for both. The seriously conscientious teacher welcomes any and all criticisms, favorable or unfavorable, because she really wants to improve her teaching; and if she and her pupils understand each other on this point her work and their work will be benefited because of this mutual understanding, feeling of responsibility, and cooperation.

A Balanced Program of Audio-visual Instruction Should Be Developed.—Probably at the present time no one of us can accurately describe a balanced program of aids, but at least we all can be certain that it is one in which there are adequate variety and proper emphasis. Variety in types of aid is necessary first because of the individual dif-

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January, 1930.

NEWMARK, D.: Students' Opinions of Their Best and Poorest Teachers, *Elementary School Journal*, vol. 29, pp. 576–585, April, 1929.

PEABODY, R. W.: Pupil-teacher Rating in Practice, *School Executives Magazine*, vol. 50, pp. 191–192, December, 1930.

SCHAFFLE, A. E. F.: The Pupil Checks the Teacher, *School Executives Magazine*, vol. 51, pp. 151–153, December, 1931.

ferences of the pupils; a particular aid will not be uniformly effective with all of them. A photograph may appeal greatly to one pupil and considerably less to another; one pupil may become enthusiastic over a working model and remain relatively passive while watching a projection of pictures. Further, even though a new aid might be very attractive, a continued and uninterrupted use of it would certainly become monotonous.

Because an aid is more helpful in certain types of situations than in others, in the interest of covering all of these possibilities, a variety of types is necessary. Each aid has its own particularized value and uses. For instance, Dent has pointed out that the stereograph is valuable in individual study; the stereopticon in the socialized recitation; the motion picture in summarizings; and the chart and diagram in presenting abstractions and assisting analysis.[1] Another of the conclusions of the Research Division of the National Education Association will illustrate this point:

> The usefulness of motion pictures would be enhanced if they were so organized as to confine themselves to their own peculiar provinces. Their province seems to be the exhibition of moving objects and particularly to facilitate the analysis of motion. They are outside their province when they show still objects or when they enter the field of abstract verbal discussion.[2]

The fact that there remains so much to be done in determining scientifically and satisfactorily the fields of greatest usefulness of each aid means that the use of a wide variety of aids and a continuous evaluation of them under all sorts of settings are imperative. Out of this experience and study will come the standards by which a program can be judged as being "balanced" or "unbalanced." And the individual teacher and her pupils can contribute by making serious attempts to evaluate their own experiences.

The Aids Should Be Properly Protected and Preserved.—Nearly all sensory aids will be used many times and it is only reasonable that they should not only be used carefully, but also be protected between usings. A smudged picture, broken model, torn map, or cracked slide will discourage initial interest and decrease respect. Where the aids are used by the individual pupils, suitable previous instruction in their use will help to insure that they are carefully handled.

Pictures, clippings, maps, charts, posters, and similar materials may be mounted on cardboard, Beaverboard, or railroad board, shellacked or lacquered, covered with isinglass or Cellophane, edged with partout tape, and filed in folders or cabinet space. The larger materials can be glued to cloth, stretched tight, dried under pressure, rolled around dowels or sticks, and filed away in a receptacle or hung up on a rack. Certain types of specimens can be mounted on heavy cardboard or be framed and covered with glass. Models and machines can be rubbed off, cleaned, and placed in appropriate spaces in cases, drawers, or on tables. Phonograph records should be returned to their jackets before being filed. Suitable filing cabinets, cases, drawers, stands, rollers, and holders are, of course, necessary. An appropriate cataloguing or indexing system, such as the Dewey decimal, will help to make the aids easily available.[1] If the pupils themselves are allowed to participate in this work of preparing, caring for, and filing, they will take a greater interest in properly maintaining the collection.

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[1] DENT, E. C., "The Audio-visual Handbook," rev. ed., p. 15, The Society for Visual Education, Inc., Chicago, 1939.

[2] *Op. cit.* p. 453.

Aids Should Be Located Conveniently and Circulated Efficiently.—"The organization and administration of visual materials must be such that they are available at the precise moment when the teacher wants them," says Dent.[2] This is most certainly true. If the teacher does not have the aid just when she needs it, or if she gets it when she does not need it, she will have to make adjustments in her lesson plans, and last minute alterations always represent confusion and waste, with resultant emotional attitudes on the part of both teacher and pupils that are anything but respectful and favorable to happy learning. An efficient system of requisitioning, obtaining, and returning the aids is basic to a properly functioning program. This administration is so important that an entire chapter will be devoted to it later.

A Healthy Community Support of the Program of Audio-visual Instruction Should Be Developed.—Healthy community support is essential to the proper development and functioning of an efficient school system, because this system concerns the community's buildings and equipment, expenditures, employees, and children: it represents the community's biggest and most important business. And this support will never come unless intelligent steps are taken to foster and promote it. This is one very important phase of educational responsibility that many school administrators neglect, often, ultimately, to their own sorrow. Because of the rapidity with which educational conceptions, materials, equipment, procedures, and emphases are changing, it is absolutely necessary that the community be continuously enlightened if the school is to become modern and be kept so.

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[1] Pertinent and practical ideas on indexing and filing will be found in "American Library Economy Series," published by the H. W. Wilson Company, New York.

[2] DENT, *op. cit.*, p. 15.

Because audio-visual instruction as a definite part of educational policy is new in most schools it must be so developed and so presented to the community that it will merit and win wholesome support. Such support is especially needed in this program (1) because of the rather considerable financial investment in it, and (2) because of the possibility that the community will consider parts of it, such as motion pictures and radio, to be merely forms of commercialized entertainment instead of seriously planned education.

This program of community enlightenment can be promoted by the utilization of letters, bulletins, and reports sent to the parents; explanations, discussions, demonstrations, and dramatizations on graduation, promotion, Parent Teachers Association, and similar public programs; newspaper publicity; school night; and school, store-window, and chamber-of-commerce exhibits of equipment, materials, and results. Although, of course, exhibits of equipment and materials are educative to parents and patrons, demonstrations of their uses are still more so. This campaign should not be in any sense a high-pressured selling campaign but rather a dignified and serious program of education on a high plane. And certainly not the least important phase of it is that represented by the stories that the pupils carry home. Consequently, a smooth-working and efficient program that the pupils can easily recognize and appreciate is basic to a successful promotion of community support.[1]

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[1] See the references at the end of Chap. IV, especially the articles by Clark and Collier.

CHAPTER IV

OBJECTS, SPECIMENS, AND MODELS

Man's early learning was about things and it came from contact with things. True, he may not have understood all about them (nor does he today) but at least the sensory impressions themselves were natural, clear, and realistic. Now, centuries and centuries later, in his formalized educational institution man shows his appreciation of the value of these direct experiences and arranges systematically for the children to have them. He realizes that even the slow learning child can see some meaning in a concrete thing—object, specimen, or model. Further, he knows that it is natural and therefore pleasurable for the child to "play" with things—see, hear, feel, touch, handle, and manipulate them, and he therefore capitalizes for educational purposes this innate characteristic or trait.

Environment and Education.—Acquainting the child with his environment and leading him to understand and appreciate its many elements and their interrelationships always has been and always will be a most important aim of any fundamental education, because an individual must live in close contact with the elements of this setting. Formerly this environment was limited and its elements and relationships were easily and quickly mastered.

But times have changed. Due largely to the development of modern methods of communication and transportation, the individual's environment has increased greatly in extent. In fact, it includes just about the entire world. The individual wears clothes, rides in vehicles, eats foods, lives in houses, and uses devices which come, in part or in whole, directly or indirectly, from every section of the globe. Further, he reads, hears, and talks about these more or less distant but nevertheless real elements—people, activities, places, events, processes, products, traditions, and customs—many of which very vitally affect him. And because this environment is large and complex, its details cannot be mastered so easily and quickly as was possible when it was small and compact.

Information about his environment may come from indirect sources—books, pictures, talks, etc.—and from direct sources—firsthand contacts with it. Our interest here is in these firsthand contacts. In order to make these contacts the pupil must either go to his environment or have his environment brought to him. Both of these procedures are important and both are, in many instances, easily possible. The first of these procedures will be discussed in detail in Chap. IX, School Trips and Tours.

Obviously, only certain parts of the pupil's environment can be brought to him in the classroom. A rock, piece of lava, or leaf from a mountain can be brought in, but not the mountain itself. A locomotive or automobile is too large to be brought in, and, further, its operating mechanism is too complicated or concealed for the pupil to be able to understand it firsthand easily; prehistoric animals are no longer available, so small-scale models are used to represent them. The life cycle of an insect cannot be observed in its entirety, and the detailed processes of the manufacture of some product cannot be followed through, so for these "follow-through" processes, representations become necessary. Of course, some of these items may be represented by photographs and drawings, as well as by objects, specimens, and models. The point being made is that objects, specimens, and models,

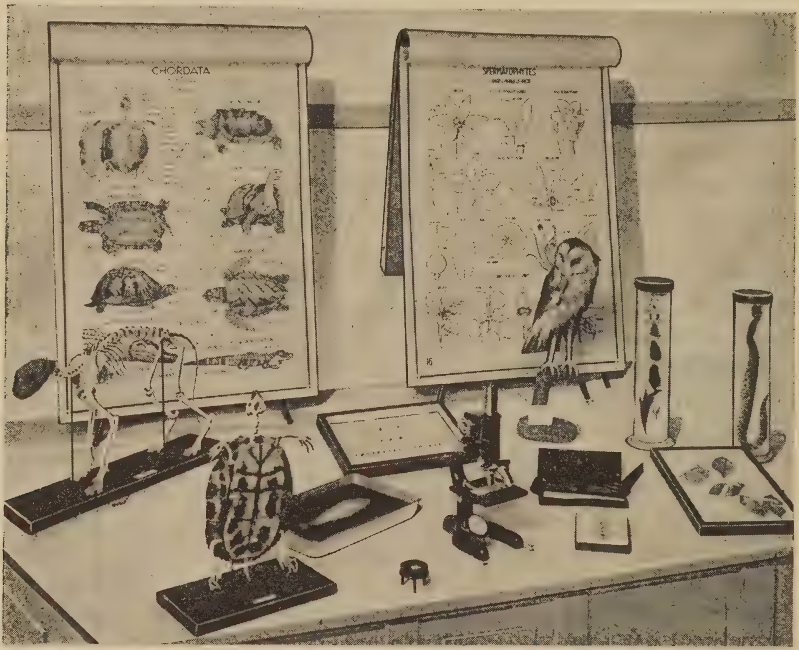

FIG. 12.—Charts and specimens help to make science more real to the student. (*Courtesy of W. M. Welch Manufacturing Company.*)

properly selected or designed and presented, can be very useful in helping the pupil to understand and appreciate the elements of his environment and the relationships of these elements.

Further, phases of this environment are represented in every subject and every activity of the school, and consequently, in every subject and in every activity there are opportunities for the functional utilization of appropriate concrete objects and processes or representations of these. To some teachers and administrators the mention of "objects, specimens, and models," would immediately limit the discussion largely to science, art, and the social studies. Such a restricted view only evidences a lack of recognition and appreciation of their possibilities. A moment's consideration of the suggested list of items (pages 62–63) will indicate some of these possibilities in literature, composition, foreign language, mathematics, agriculture, home economics, music, and other subjects. These items are also used in the so-called extracurricular activities, in dramatics, in school clubs, in home room, club, and assembly programs, in thrift activities, in school publications, in parades, store-window display, and other advertising of drives and campaigns, and in hobby and summer-activity exhibits and fairs. The possibilities of the utilization of objects, specimens, and models are as wide and varied as the entire program of the school.

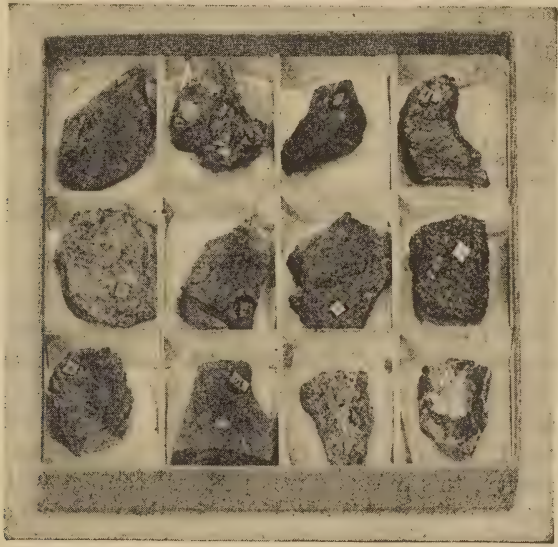

FIG. 13.—Professionally selected and prepared rock and mineral collections may be used in geology, geography, chemistry, art, and other subjects. (*Courtesy of Central Scientific Company.*)

Definitions of Object, Specimen, and Model.—Although defining the types of sensory-aid devices is less important than indicating how they may be used, yet for clarity's sake a classification or distinction should be made. The definitions suggested by Cline M. Koon of the United States Office of Education appear to be justifiable:[1] objects are "the things themselves"—insects, fruit, vegetables, thermometer, tools, weapons, fire extinguisher, leaves, animals; specimens are "parts of objects"—pieces of glass, wood, leather, paper, crystals, asbestos, or porcelain; and models are "replicas of objects"—house, engine, boat, airplane, bridge, steam shovel, or coal mine. These models may be operating—a drawbridge, pump, solar system, or water wheel, or non-operating—a weapon, animal, tool, or table.

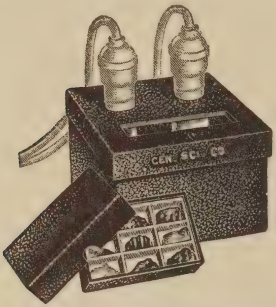

FIG. 14.—A fluorescent mineral demonstration outfit. (*Courtesy of Central Scientific Company.*)

TEACHING WITH OBJECTS, SPECIMENS, AND MODELS

Although the general principles underlying the use of audio-visual aids have already been suggested, it is appropriate here to emphasize three of the most important of these and to illustrate them with uses of objects, specimens, and models.

The Pupil Must Participate Directly.—An object, specimen, or model is used in order to give the pupil actual firsthand experience and, of necessity, this means direct personal contact with the item. Usually, the more direct this experience is, the more educative it is. And this direct experience can be direct only if and when the pupil himself sees, feels, handles, operates, and in other ways actually works with the item. Sometimes, especially in the case of a limited number of items, teacher, and even pupil, demonstration and experimentation may be satisfactory and profitable, but generally speaking, the individual members of the class should have ample opportunity for personal experience in examining leaves, hefting metals, tasting seasonings, unraveling threads, operating models and similar activities. In such instances experiencing is vital because it is personal.

Very frequently, especially in the case of a limited number of items, or the necessity for a very close supervision by the teacher, this personal experience means that the group will have to be smaller than the usual sized class. Charles R. Toothaker, Curator of the Philadelphia Com-

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[1] KOON, C. M., School Use of Visual Aids, *Bulletin* 4, Office of Education, 1938, p. 12.

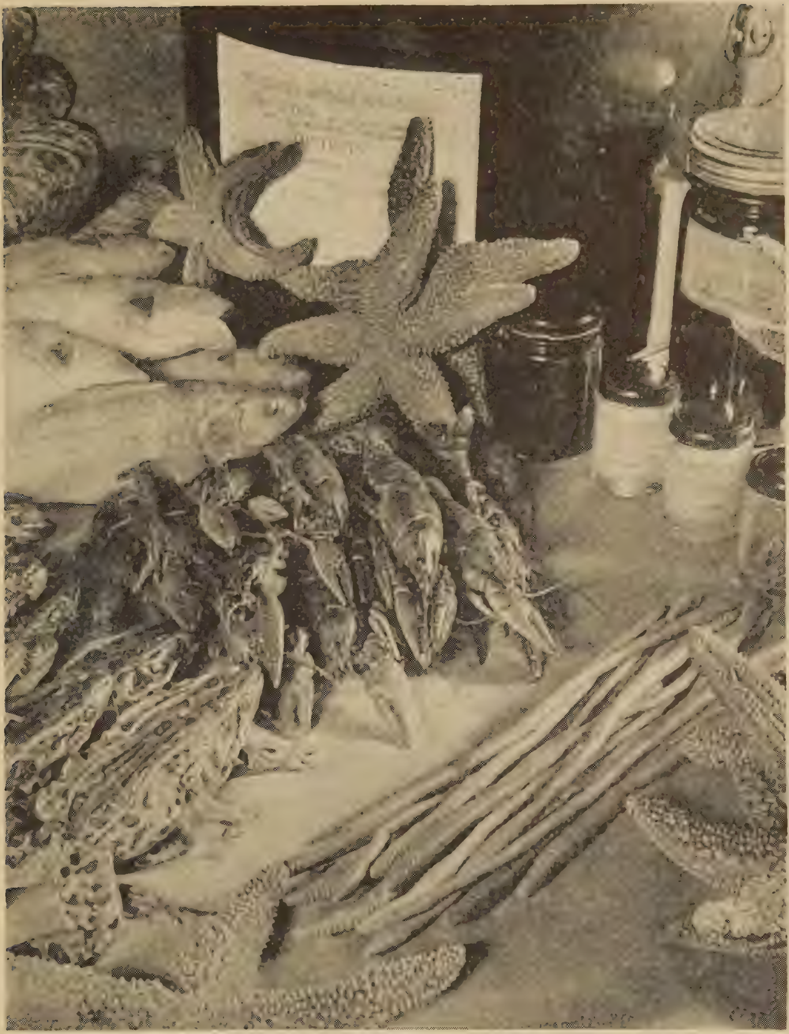

FIG. 15.—A specimen which the student himself can handle, dissect, and sketch is certain to be intriguing. (*Courtesy of Chicago Apparatus Company.*)

mercial Museum, and long an able leader in school-museum cooperation, states:

> While a great deal can be said for the visits of classes to museums and the systematic help on the part of the museum in the actual classwork, whether in the classroom or in the museum itself, there are many who believe that individual work with children, not in large groups but singly or with

two or three children together, is possibly more important than the handling of any age in large numbers.[1]

This pupil participation may be of various types, such as, reading additional material; demonstrating, experimenting, and investigating; designing, executing (or collecting), arranging, and displaying similar, imitative, or supplementary objects, specimens, or models; sketching, drawing, painting, or photographing; keeping diaries or records; writing stories, descriptions, poems, and jingles; and discussing or debating before his own or other groups. Here again, individual interests, capacities, and abilities should be recognized, respected, and capitalized.

Observation and Use Must Be Educative.—It has already been pointed out that in the utilization of any aid the teacher must have a definite purpose in mind and she must also guarantee that the pupils themselves recognize it and appreciate its place and importance. In looking at an item, say a model of an automobile, pupils may see it from different angles: one may be interested largely only because it is novel; another may be thrilled by its aesthetic appeal—its proportions, lines, and color combinations; another may be equally stimulated over its mechanical parts and their operation; another may appreciate its economic implications; and another may see only its provisions for safety. It is quite possible that none of these "seeings" may represent the teacher's main purpose in showing the model. It is proper for the pupils to be given an opportunity to have some little undirected first experience in the phases that appeal to them, but after this the teacher must center their attention on the phase that represents the purpose of the lesson or unit of instruction. The pupils must be led to look definitely for something, not merely be allowed to look.

In the second place, the pupil's attention must be so directed that he sees the object or specimen in relationship to its proper surroundings; he must see a leaf as an essential element of a tree, and the tree as an essential element of man's environment.[2] In the case of models, it is sometimes rather difficult for the pupils to appreciate a model because (1) it is out of its functional relationships; (2) it is larger or smaller than the original; and (3) it is oversimplified. The teacher must help the pupil to "bridge the gap" between the model and the original. Henry Johnson pertinently says:

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[1] TOOTHAKER, C. R., *Proceedings*, National Education Association, vol. 68, p. 925, 1930.

[2] This is a true story. Just recently a Chicago schoolteacher showed a stalk of wheat to 206 seventh- and eighth-grade pupils and asked them what it was. Fifty-four of the pupils named it correctly; 109 did not have the least idea what it was; twenty-seven said it was oats; eight, rye; five, barley; one, corn; one, bearded wheat; and one boy thought it was a corncob. Of course it is quite as probable that the exhibition of some object peculiar to city life would be as unidentifiable to a group of rural children.

> But its (exhibition method) value as a means of recalling reality is easily overestimated. What is the nature of the imagery? . . . Models and pictures are not entirely concrete exhibits. They are representations and not reproductions. . . . Models and pictures must, therefore, be consciously treated as aids to visualization and not as subjects to be themselves visualized. They are materials to be developed. The direct appeal to the eye is in most cases only a beginning.[1]

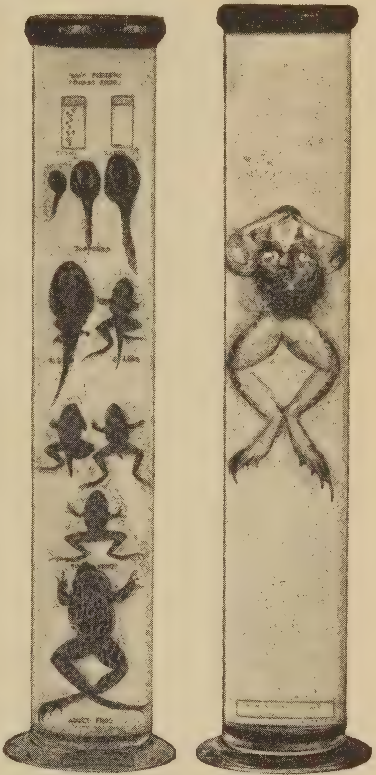

FIG. 16.—By means of this eleven-stage series the student can follow the life history of the frog. Then he can turn the jar around and see a dissection of an injected adult specimen. (*Courtesy of W. M. Welch Manufacturing Company.*)

Further Interest, Application, and Activity Must Emerge.—Although the study of an object, specimen, or model should satisfy the immediate needs or lacks felt by the pupils, it should also stimulate to further inquiry and activity. In the example suggested above, merely seeing or even operating the model is not nearly so important as recognizing how the automobile has very vitally affected, either directly or indirectly, nearly all of man's activity—economic, political, commercial, social, and educational. The inferences, implications, and applications involved should lead to an appreciation of broader relationships and more generalized and abstract experience, laws, and principles.

It is, of course, entirely possible that time and efforts spent on these concrete objects and processes may be uneconomically used. "Not only is he idle who does nothing, but also he who might be better

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[1] JOHNSON, H., "Teaching of History in Elementary and Secondary Schools," pp. 227–228, The Macmillan Company, New York, 1922.

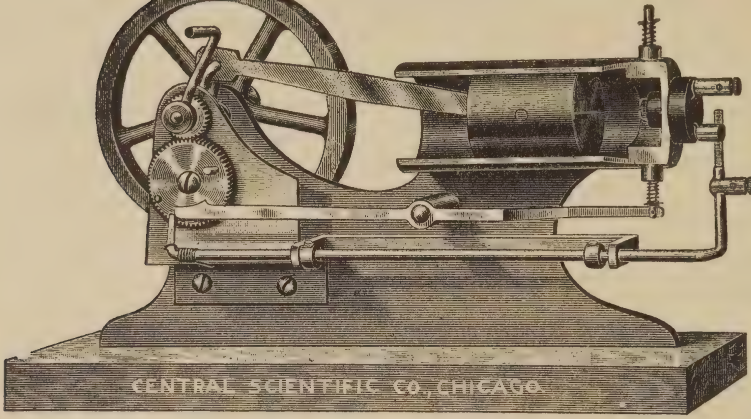

Fig. 17.—Cutaway working models show very clearly both the construction and the operation of mechanical devices. (*Courtesy of Central Scientific Company.*)

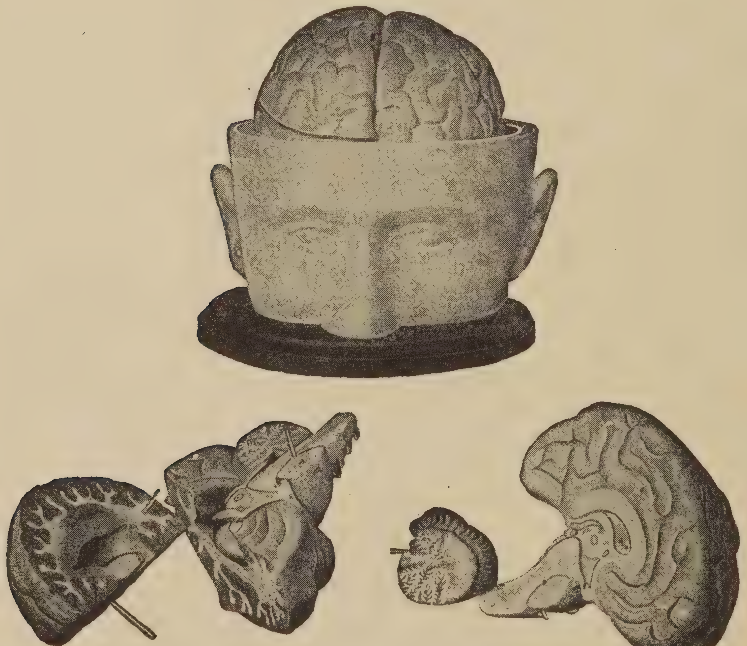

Fig. 18.—This life-size, naturally colored, and dissectible model very strikingly and accurately shows the parts of the human brain and their relationships. (*Courtesy of Central Scientific Company.*)

employed," runs an ancient adage that is as true in perceptual learning as it is in any other connection. If the pupils in their seeing, handling, and generalizing receive only experience, or false or artificial experience, their time and efforts are, relatively speaking, wasted. Doubtless many really interesting projects in designing and constructing models have represented a poor investment, educationally.

Too, it should be needless to state, all such experience should be definitely and directly correlated and integrated with the important past, present, and future considerations of the material represented by this particular topic or lesson.

THE SCHOOL MUSEUM

Every school should have a museum, and every school can have a museum. It is well known that children like to collect, and that many of them have collections of their own. If it is appropriately suggested to them, they will doubtless react most favorably towards the idea of a school museum and cooperate most enthusiastically in developing it. Such a project is intriguing and it is educative. Planning, accepting, and discharging individual responsibility, doing the necessary research in obtaining, understanding, classifying, mounting, and labeling exhibits, evaluating their own and their neighbor's efforts, and working together for the common good certainly mean educational benefits.

Fig. 19.—Probably in studying this model the pupils find that a meteor crater is something more than a mere hole in the ground.

Further, such a project is not particularly difficult. It can capitalize almost any kind of collecting interest, thus guaranteeing variety in the final exhibits. It is also easily possible because objects, specimens, and models are easy to obtain and inexpensive to mount and display. Fannie W. Dunn says: "No environment is so poor as to afford no materials of value, and none so rich as to require no supplementation."[1] What are some of these materials?

Material for the School Museum.—The following list will suggest a few of the items, objects, specimens, and models that can be included in the school museum:

Anatomical: skulls, bones, claws, organs, feathers, teeth, skins.
Animals: rats, mice, rabbits, kittens, squirrels.[2]
Apiary: bees—drones, workers, and queens; honey, comb honey, beeswax.
Aquarium: fish, tadpoles, frogs, turtles, snails, water plants.
Art: pictures, paintings, sculptures, posters, advertising illustrations.
Beverages: cocoa, coffee, tea, soft drinks.
Building material: brick, tile, wood, metal, paint, nails, asbestos, hardware.
Clothing: period and costume; hats, shoes, dresses, coats, gloves.
Coins, money, and stamps:[3] domestic and foreign; ancient and modern.
Communication: ancient methods and materials; telephone, telegraph, radio.
Cooking and serving equipment: dishes, utensils, devices.
Curios and souvenirs.
Dolls: ancient and modern; domestic and foreign; clothing, equipment.
Fabrics: ancient and modern; domestic and foreign.
Flowers: local and national; wild and domesticated; fresh and pressed.
Foods and food products: domestic and foreign.
Foreign articles: money, foods, clothing, stamps, posters, pictures, games.
Fuels: wood, coal—anthracite and bituminous, oil.
Fungi, mosses, lichens, and galls.
Furniture: beds, chairs, tables, etc., ancient and modern.
Grass and grass seeds.
Indian relics: arrowheads, flints, celts, hatchets, fishhook, harpoon, pottery.
Insects: bugs, moths, butterflies, grasshoppers, flies, larvae, eggs.
Jewelry: ancient and modern.
Leaves, twigs, nuts, seeds, galls.
Metals, pure and alloy.

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[1] Materials of Instruction, "Eighth Yearbook," p. 42, Department of Supervisors and Directors of Instruction, 1935.

[2] Keeping live animals in school buildings may be somewhat questionable. Care, humane treatment, odors, health, and other considerations are involved.

[3] See Wilber Emmert, Postage Stamps and School Work, *Educational Screen*, vol. 16, pp. 196–199, June, 1937. This excellent article also includes a good bibliography.

Plants: flowers, ferns, grains, cacti, vegetables, bulbs.
Nests: bird, rabbit, wasp, mud-dauber.
Pictures: paintings, drawings, sketches, daguerreotypes, photographs, reproductions.
Post cards and illustrated travel folders.
Pottery: vases, bowls, birdbaths, water bottles, ash trays, pitchers.
Publications: books, bulletins, magazines, newspapers.
Raw materials: cotton, flax, silk, latex, foodstuffs.
Radio equipment and materials.

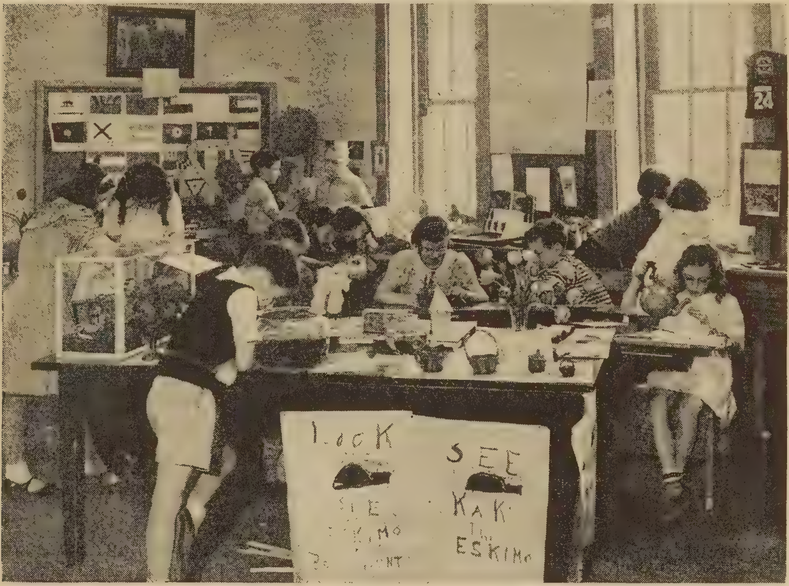

Fig. 20.—Individual examination and representation are instructive to these Hamburg, New York, students of nature.

Reptiles: snakes, lizards, salamanders.
Rocks, stones, minerals, ores, fossils, petrified wood.
Seasoning: salt, sugar, pepper, spices, nutmeg, cinnamon, vinegar, sage, cloves.
Seeds and grains.
Shells: conch, scallop, oyster, clam, sea horse, crab, coral.
Timepieces: devices, watches, clocks; ancient and modern.
Tools and implements: ancient and modern.
Toys and playthings: domestic and foreign; ancient and modern.
Weeds and weed seeds.
Wood: various kinds, cut to show grain; knots, bark, unusual growths, burls, cones, nuts, buds, pulp, sawdust, diseases.

These items may come from a variety of sources such as (1) the pupils' homes; (2) the community; (3) local and distant industrial and commercial establishments; (4) fairs and exhibitions; (5) city and state chambers of commerce; (6) exchanges with other pupils and schools; and (7) public and private museums.[1] Some of these items may be obtained for permanent exhibition and use, and some of them may be borrowed for temporary use. Many of the models may be made by the pupils themselves. Discrimination should be used in order that only really educative material be collected or made. A good school museum is not merely a collection of items but a usable collection of useful items.

Preparing Objects, Specimens, and Models.—Although the pupils should not attempt to rival museum experts in the preparation, mounting, and display of items, yet at least they should attempt to imitate the recognized and accepted procedures of these professionals. And it is really surprising what can be done by the teacher and her pupils with such simple articles and materials as the following, all of which can be collected: jars, bottles, cans, wooden boxes, pasteboard boxes, cigar boxes, window glass, shades and rollers; paints, nails, glue, wire, cotton, old picture frames, thread, string, pins, thumbtacks, blotting paper, Beaverboard, Celotex, tape, cement, magnifying glasses, brushes and simple tools. While this is not the proper place for a description of the detailed processes of making exhibits, a few suggestions will indicate some of the simpler possibilities.[2]

Mounting and Constructing Exhibits.—Metals, ores, leaves, shells, woods, and similar objects and specimens can be wired, nailed, glued, or screwed onto mounting boards (either made or purchased) of wood, plywood, Beaverboard, or Celotex, or onto the bottom of shallow boxes or drawers.[3] Butterflies and moths may be placed on cotton in shallow glass-covered boxes or frames. Seeds and grains may be placed in jars or bottles; live insects, in moist earth and twig-supplied glass jars with perforated lids; toads, snakes, and lizards, in screened boxes supplied with rocks, earth, and moss; nests, on enclosed shelves; and fish, tadpoles, and water plants, in a bowl or aquarium. Working models should be mounted on a wooden or metal base.

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[1] For instance, raw materials such as cotton, silk, flax, latex, etc., can be purchased very reasonably from The Commercial Museum, Philadelphia. See also the list of sources on pp. 366–369.

[2] Very practical detailed suggestions on preparing material for exhibition may be obtained from Grace E. Ramsey's 25-page booklet, "Project Making in Elementary Science," published by the American Museum of Natural History, New York, 1934. See also her article referred to in the bibliography. Planning and arranging exhibits of rocks and minerals are described in F. B. Loomis, "Book of Common Rocks and Minerals," G. P. Putnam's Sons, New York, 1923.

[3] Suitable supplies may be purchased from the Denoyer-Geppert Company. See p. 369.

Evolutionary exhibits can be easily and effectively planned and executed. Typical ones are the life cycle of a butterfly, moth, dragonfly, or Japanese beetle; the reduction of ores; the fabrication of alloys; the growth of plants and flowers; the manufacture of soap; the preparation of sugar; the development of artificial lighting or of water, land, or air transportation, showing the process from the raw material or the beginning through the stages of growth or manufacture to the final product.

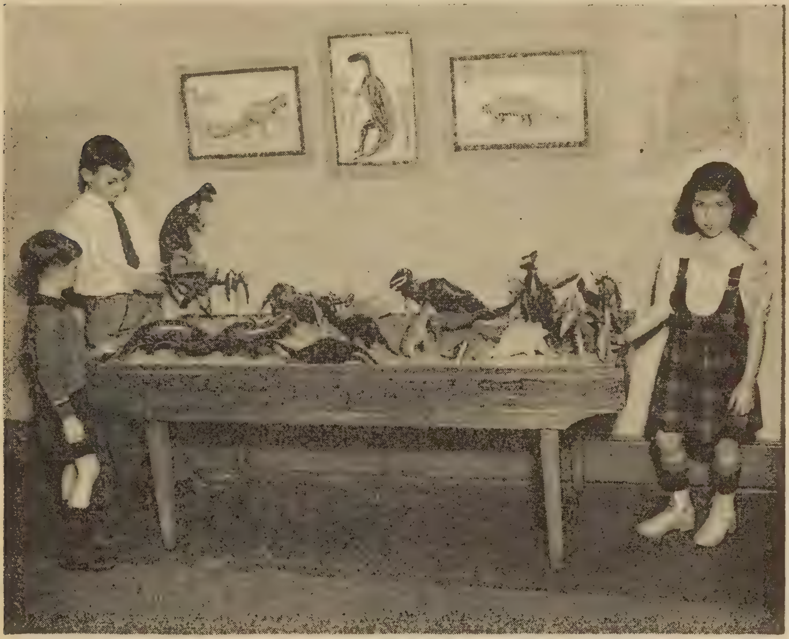

FIG. 21.—These realistic Dinosaur models, made from inner tubing and stuffed with cotton batting, were part of the visible results of a study of the "Ages of Life" by the fifth-grade pupils of Miss Margaret Noel of the State Normal School, Fredonia, New York. Note the sketches and the chart on the wall. (*Courtesy of The Instructor.*)

The pupils may even design and execute more complicated exhibits such as a habitat or similar natural group. A very brief description of how the elements of such an exhibit are made may be suggestive. A habitat composed of earth, water, shrubs, trees, grass, and insects may be constructed on a suitable board base. The water is represented by a piece of window glass painted on the underside. Soil is shown by pebbles, sand, and sifted earth on glue; irregular heights by plaster of Paris on pieces of propped up screen; grass by hemp, bristles, flax, dried grass, or excelsior glued in holes in the base and properly trimmed and colored; trees and shrubs are cut from sponges or constructed of twigs and glued-on paper leaves. Insects, and even birds and beasts, can be suitably set, mounted, or suspended. A painted background, preferably semicircular in shape, helps to give a very realistic appearance to the group. The exhibit should be placed in a covered and glass-enclosed case and may, if desired, be electrically lighted.

In a similar manner such other exhibits as these may be developed: Eskimo village (snow is made by spraying melted paraffin), Indian village, primitive village, aquarium (dry aquarium with frogs and suspended fish and tadpoles, and plants, sand, rocks, bugs, etc.), soil erosion, irrigation projects, models of famous buildings or groups of buildings (made from plaster of Paris on built-up frames of lollipop or other small sticks, pieces of wicker, and plaster of Paris, plasteline, wax, paraffin, or putty models of fences, animals, men, walks, stones, etc.), and relief maps.

Labeling.—In order to be most meaningful an exhibit must be suitably labeled. The better these labels are, the more interesting and helpful the exhibits will be. Therefore a considerable amount of time may very profitably be spent in planning and executing them. A good label, must, first of all, be self-explanatory. Although it should be accurate scientifically, in so far as this is necessary, the description should be reduced to its lowest terms. As a matter of fact, scientific names are now omitted in the newer museum exhibits designed largely for pupils. The label should be neatly written, preferably typed, or printed (letters printed by hand). The label should be brief, and it should be located so that it does not cover any important part of the exhibit and where it can be easily read by children of all sizes. In any and all cases the label should be such as not to distract attention.[1]

Location and Display.—The school museum is not completed when the exhibits have been made and labeled; the exhibits must be located accessibly and displayed attractively if they are to become effective educational agents.[2] Exhibits are designed in order that they may be seen and used and consequently a favorable location is necessary. The exhibits may be (1) placed in the corridors, provided there are sufficient room and light; (2) in the library or other centrally located room; (3)

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[1] See Bryan Emmert, Inexpensive Lettering Aids for Teachers, *Educational Screen*, vol. 18, pp. 94, 96–97, March, 1939.

[2] A pertinent discussion of the details of plan, illumination, and layout will be found in Hoban, Hoban, and Zisman (see bibliography), pp. 292–295.

scattered around in the various classrooms; or (4) located in a special wing of the building or in a separate building. Under certain conditions all of these locations might be satisfactory. The main thing is to locate them where (1) the pupils can see and use them easily and without formality; (2) they can be used without disturbing other pupils and teachers; (3) they can be easily moved, if necessary, to the various classrooms; (4) they are suitably protected; and (5) they can be grouped to represent an artistic addition to the school's equipment. Facilitating their use will also facilitate learning.

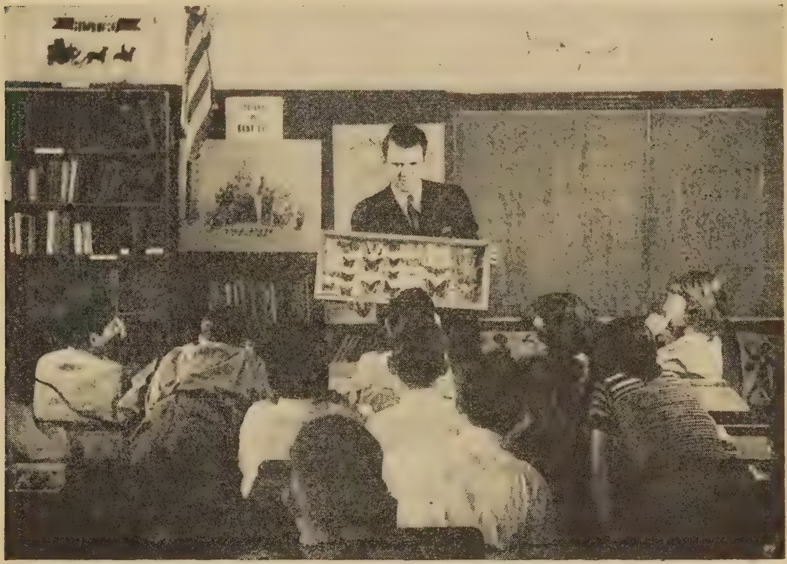

FIG. 22.—Nearly all museums have exhibits which they loan to schools. Here Mr. Stoll of Public School 138, New York City, is showing his 6*B* class a case of insects borrowed from the Brooklyn Children's Museum.

Cooperation with Public Museums.—The modern museum is not a depository but an educational institution; no longer is it a "passive or static agent of instruction, disseminating knowledge chiefly to the more or less casual visitor (and) concerned with the preservation of records, scientific and historical. . . . The modern museum now stands as an aggressive force in education" as Sherwood states it.[1] Many of these museums lend (often for a week or two) exhibits and materials (usually in specially constructed portable cases, and frequently delivered by their own trucks), provide lectures (personal, printed, or sound film), give counsel and advice, hold classes for both pupils and teachers, and cooperate with the schools in other ways. This cooperation is very profitable to the pupils because of the wealth and quality of the material available and the expertness of the museum staff. Too, it helps to develop cordial relations and so encourages and stimulates the pupils, both as children and as adults, to make further trips to the museum. This work, which is designed to correlate closely museum service with the curricular and extracurricular purposes, activities, materials, and methods, will develop still more as school and museum administrators recognize, appreciate, and capitalize the opportunities.[1]

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[1] SHERWOOD, G. H., The School Service of the American Museum of Natural History, *Visual Education Magazine*, February, 1922.

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[1] See the articles by Coleman, Greene, Meissner, Sayward, and Walker in the bibliography. An excellent book to read in this connection is G. F. Ramsey, "Educational Work in Museums of the United States," The H. W. Wilson Company, New York, 1938. Incidentally, this book, which is an expanded thesis, points out that only 210 of the thousand-odd museums in the United States in the 1931 Handbook reported any educational work. There seems to be opportunity for development here too.

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The Museum Journal is published at the University of Pennsylvania, Philadelphia. Many of the larger museums publish booklets, pamphlets, and other material which the teacher and her pupils will find helpful.

CHAPTER V

GRAPHIC MATERIALS

The aids discussed in the previous chapter vary in degree of concreteness, or abstractness, but even those that can be classified as somewhat abstract are essentially concrete because they reflect more or less naturally such elements as form, mass, height, weight, size, time, temperature, motion, action, and light, and some of them provide experience through more than one of the senses. We now come to a consideration of some visual aids that are much more abstract because they contain very few of these concrete elements and, with but few exceptions, provide experience through sight only. In these, commonly designated as graphic materials, ideas, concepts, objects, and principles are represented by lines, colors, figures, and numerals which in themselves mean little or nothing until they are translated into the realities that they portray. They are highly symbolic.

In planning his representation—map, graph, cartoon, or diagram—the representer selects those items he wishes to show or the emphases he desires to make, always relatively few, eliminates or subordinates nonessentials and presents them boldly, vigorously, and often dramatically. In some types, notably the cartoon, he frequently distorts and exaggerates in order to make his presentation the more striking and the more easily understood. Usually these representations are two-dimensional only.

MAPS

Man is map-minded; he could not live if he were not. Maps are absolutely indispensable. From the time when as an infant he first begins to experience things around him—persons, chairs, tables, doors, windows, animals, etc.—and notes their size, location or position, differences, relationships, and meanings, up to the time of his death, he is continuously making and using maps, either mental or graphic. To many adults a "map" means a sort of colored poster hanging in a classroom. This conception is, of course, fairly accurate only when the formal map is thought about. It is far from accurate and complete when the map idea in its entirety is considered.

Maps, as we shall consider them here, are graphic representations of the surface of the earth, or particular sections of it, showing the relative size and positions of the parts represented. Directly and indirectly maps reveal an enormous amount of information—sizes, shapes, and locations of areas, distribution of peoples, land, water, animal and vegetable life, climate, economic resources, and other natural phenomena, and the associations of these many elements. Little wonder that maps have been called the "encyclopedia of man's existence."

As educational devices, maps help the pupil to visualize and localize important world realities that he could never realize, understand, or appreciate from written or oral descriptions or even photographs, and which he could never even see himself, because of the number and extensiveness of these elements and their complicated relationships. The map, as a record of spacial concepts, tells a story as nothing else can tell it. Naturally, then, pupils must be taught to read these stories intelligently.

Although maps, which are used more than most other types of visual aid, have always been in our schools, those of an earlier day were limited in number and variety, highly formal in presentation, and were consequently very abstract. Further, they were used almost entirely in connection with group instruction in geography and history. Now, many maps and many types of maps, much more artistic and meaningful, are used for both group and individual instruction. They are utilized in connection with almost every subject in the curriculum. And they are being used more intelligently and more effectively than ever before.[1]

Types of Maps. *The Globe.*—This type of map is more accurate than the flat map because it actually resembles the earth in shape, and water and land masses are shown in proper relative sizes and positions. When a spherical or three-dimensional representation is translated into a flat or two-dimensional map distortions are inevitable. Further, in addition to depicting the relative sizes and relationships of the world's geographical divisions, the globe can be used to show clearly the earth's movements, to demonstrate changes in time, and to teach the meaning of latitude, longitude, and other basic facts and principles.

[1] Such questions as the following will help a teacher or group to evaluate a map being considered for school use: What is the date of the map? Is it large enough to be easily read? Does it include the material necessary for its proposed use? Does it appear to include too much material? Are the names and other designations distinct enough to be read easily? Does it include a key? Is the coloring accurate? Are the color combinations attractive? Is it printed on substantial stock? Can maps of particular areas be hung side by side for comparative study? Does it include insets? Do the insets represent usable material? Is the producer reliable?

Although a little less convenient to handle, the suspended globe is more realistic than the mounted.

While they are less accurate and involve the difficulties of comparing the surfaces on different "sides" of the sphere, relief globes can be used to give general ideas or impressions of relative elevations.

The main weaknesses or disadvantages of the globe are, first, the small size of the representations of the individual parts of the world; and second, the difficulty of translating back into reality the dimensions of the miniature world. However, despite these drawbacks, there is a place in visual instruction for the globe. In fact, probably nearly all teachers would say that it is absolutely necessary; that if only one map could be provided, the globe should be that one.

The Relief Map.—This map, which is widely used in industrial and commercial activities as well as in schools, is a realistic model of an area in which the inequalities of surface—depressions and elevations—are shown in relief. Because the world is so large and surface irregularities in a model are so small, and because the various sections of a sphere are not readily comparable, the relief globe is not used so extensively as the map in which the area is more limited. Naturally, the smaller the area reflected, the more real the differences in elevation appear. Relief must be exaggerated to be brought out effectively and hence relief maps are only relatively accurate. They are designed to give a general impression rather than precise information.[1]

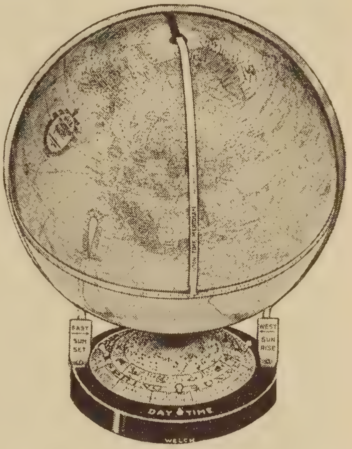

Fig. 23.—The Hall Tellurian Globe, which, when set by the simple movement of two indexed points, automatically shows sunrise, changes of season, long and short days, polar nights and days, and other interesting phenomena incident to the movements of the earth. (*Courtesy of W. M. Welch Manufacturing Company.*)

The physical map is a flat map in which the relative elevations are shown by one of these four methods: (1) shading; (2) contour lines which connect all points on a particular horizontal plane or elevation; (3) layer or hysometric coloring, which, following the plan adopted for the International Map of the World, utilizes blue for the sea, and green, yellow, brown, and red for progressively higher elevations; and (4) hachure. The political-physical globe is widely used by teachers. A commonly used substitute for a relief map is a photographic reproduction of it.

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[1] This is not true of contour maps which show the configuration of a surface by contour lines drawn at regular intervals of elevation. A crowding of lines indicates steepness.

The Flat Map.—The more important types of flat maps will be classified and considered first, on the basis of their content, and second, on the basis of their general form.

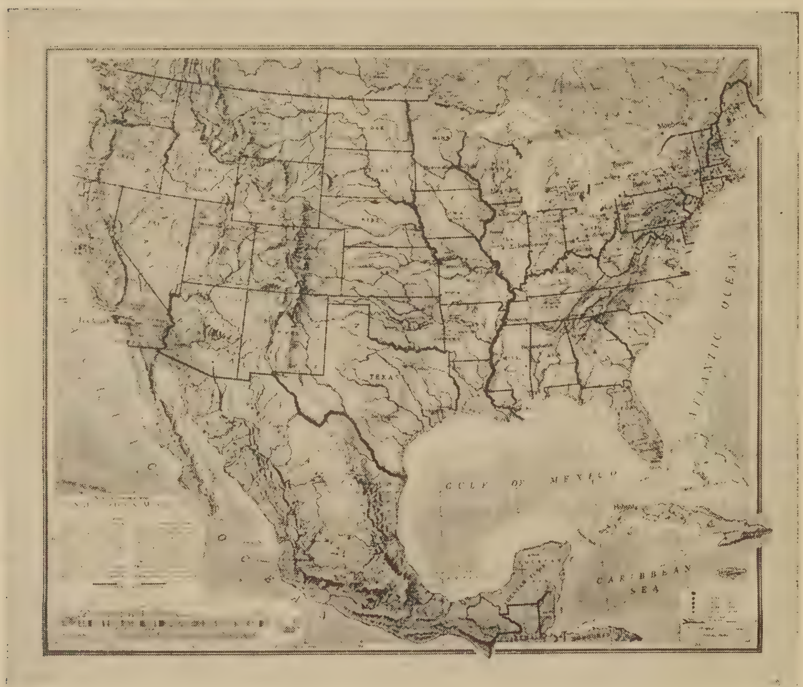

FIG. 24.—Large-scale relief maps are more convenient to handle, more durable, and cost far less than plaster relief models. (*Courtesy of A. J. Nystrom & Company.*)

Projections are maps in which the globe or three-dimensional is translated into the flat or two-dimensional map. These maps always show areas in more or less distorted form, depending on the size of the total area represented and on the scheme of the projection. With some, the larger the area included the more distorted are the elements represented. There are numerous projections. Prominent among world maps are Mollweide's Homolographic, Van der Grinten's maps, Goode's Homolosine, and Boggs's maps. The use of several of these in the upper grades will help to show the principles underlying each and also give a clearer idea of the relative sizes and positions of areas.[1]

Types of Flat Maps according to Content.—Often several of the following types of maps are combined into a single map, that is, the data of several are represented together on one. Increasingly publishers are producing combinations that include a single main large

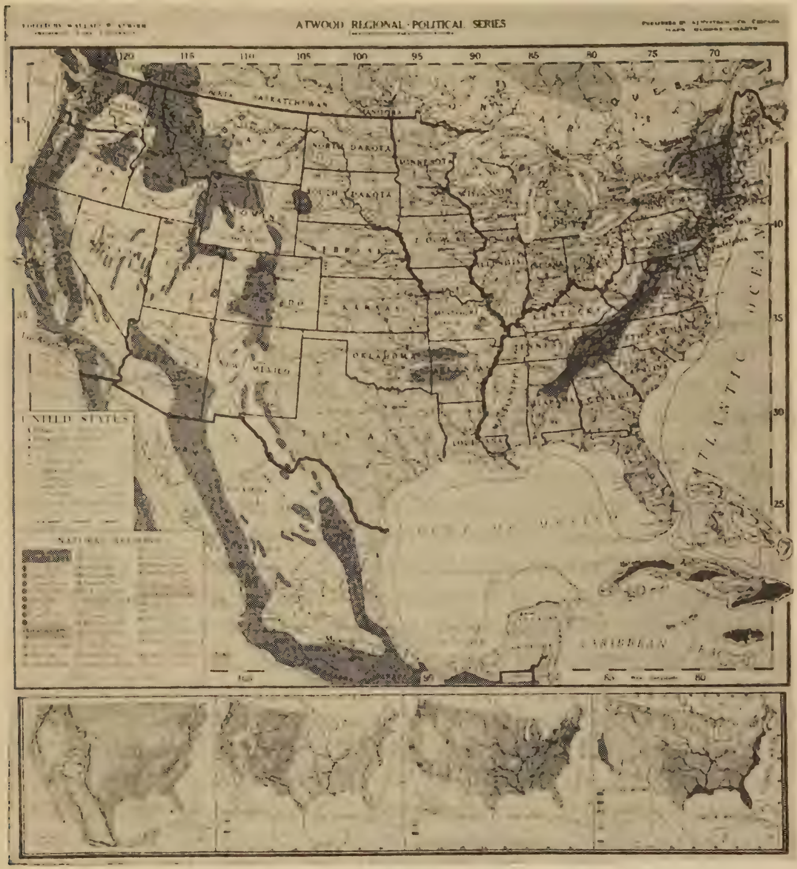

FIG. 25.—A well-planned and edited map, such as the Atwood Regional-Political map shown above, presents the influence of physical and climatic environments and the resultant patterns of population and land use. Relationships between natural and cultural environments and man's responses are revealed. (*Courtesy of A. J. Nystrom & Company.*)

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[1] For a good discussion of map projections see W. E. Johnson, "Mathematical Geography," Chap. X, American Book Company, New York.

map with smaller supplementary maps showing different content, all on the same sheet. The most readable of these smaller maps are made on the basis of an easy fraction of the scale of the larger map, such as one-fourth.

Political Map.—This map shows the boundary lines of political units or countries, together with the principal cities, rivers, lakes, seas, mountain ranges, etc. Because of the absence of pictorial elements and representations of environmental relationships this map is very abstract.

Political-physical Map.—This type of map combines the political and the relief map ideas. It shows the natural environmental forces and relationships that influence man's mode of living, his occupations, and his activities. It is more valuable for school use than the mere political map because it brings in the related nature elements. It is more valuable than the pure relief or physical map because it includes human elements.

Population Map.—This map shows the distribution of population, usually on the basis of the number of people to the square mile, or other chosen unit of measure.

Economic Map.—This, sometimes called a "products," "industrial," or "commercial" map, shows the resources or chief industries of the various areas—agricultural, lumbering, mining, manufacturing, etc. The specialized economic map shows the distribution of the various forms of a particular industry. For instance, an agricultural map of the United States shows the areas in which the various types of farming—corn, wheat, cotton, tobacco, tropical crops, hog, cattle dairying, etc.—are most common.

Rainfall or Precipitation Map.—By means of shading and other devices this type of map indicates the approximate amount of rainfall or precipitation in the various parts of the country or in the entire world, and this, in turn, helps to explain soils, vegetation, crops, products, industries, and distribution of people, as well as man's activities in each of these sections.[1]

Temperature Map.—This map shows the geographical distribution of temperatures, and, like the rainfall map, helps to explain the influence of environment on man's life. The implications or relationships of latitude, longitude, altitude, winds, proximity to bodies of water, and general climatic conditions are also brought out.

Soil and Vegetation Maps.—The soil map, usually colored, shows the distribution of the various kinds of soil—swamps, grasslands, deserts (dry, cold), rock, etc. The vegetation map shows types of vegetation. Both of these maps reveal the influence of soil and vegetation on man's occupational pursuits.

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[1] Other types of weather and climatic maps are pressure, ocean currents, climatic regions and types, yearly isotherms, and yearly isobars.

Road Map.—This easily available and very readable adjunct of modern civilization contains a great deal of very practical material and up-to-date information concerning cities, states, landmarks, memorials, routes, scenic beauties, natural phenomena, climate, topography, vegetation, occupations, history, literature, and other items of interest and value.

Other Specialized Maps.—Illustrative of other types of specialized flat maps are: history, which shows military invasions, campaigns, and conquests, exploring expeditions, territorial accessions and expansions, and the development of cities, states, and empires; literary and music, which reflect environmental influences in the lives of authors and composers, as well as in their characters, settings, stories, and music, and authors' and composers' trips and travels; health, showing the prevalence of disease, frequency of accidents, and the location of institutions and services; language, locating nationalities or language speaking groups; and religious, which depict the regional origin, development, travels, and present locations of groups or organizations.

Types of Flat Maps according to Form.—On the basis of method of presentation and use maps may be classified as indicated below. Some of these forms are more appropriate for the presentation of certain materials than others, and too, some of them are more suited to individual than to group instruction.

Outline Map.—There are two types of the outline or base map, sometimes called the "project" or the "problem" map, and these are similar in general form but differ in size and therefore in class use. The larger or blackboard map[1] is used for group instruction, while the smaller or desk map is used individually by the pupils. The outline is really a skeleton map. For instance, the geographical outline map shows only the most important outlines or political divisions, rivers, and bodies of water. The pupils fill in the details. Usually the main part of the map is black and the lines are white or yellow. The filled-in material may be erased and the outline used again and again. In one form of desk map the outlines are printed on paper and each map can, of course, be used but once. This map offers many fine opportunities for pupil activity of the project, examination, and other types. Other examples are the music staff which shows only the lines and spaces, the graph which shows only the grid, and the bookkeeping which shows only the horizontal lines and the columning.

[1] Large maps may also be projected. See footnote on p. 78.

Completed Wall Map.—This map, usually hung on the wall or mounted on a stand, is used primarily for group instruction. It is comparatively free from confusing details, reflecting chiefly information or data of major importance, and is usually large enough to be read by the average pupil seated at the rear of the room.

"Projected" or Enlarged Map.—Maps may be thrown on the screen from slides or film strips, or by the opaque projector. Even outlines for the pupils to trace can be projected on the board or on paper.[1]

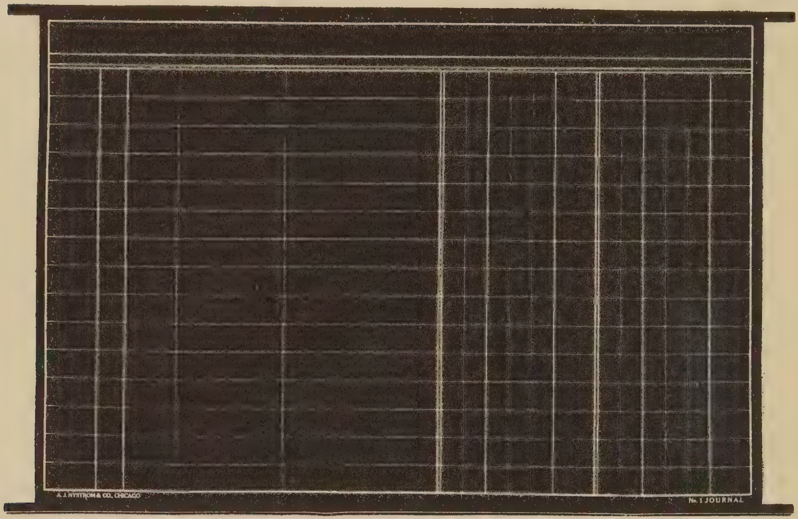

FIG. 26.—Outline maps and charts are commonly used in geography, music, and other subjects. Here is a bookkeeping chart with journal ruling. (*Courtesy of A. J. Nystrom & Company.*)

The transparent map is drawn on glass or other transparent or translucent material and placed in front of artificial or natural light.

Sand-table Map.—The sand table is often a very convenient device through which simple flat and relief maps for temporary use may be made. Drawn or cutout lines and figures may represent elements, and relief modeling may represent elevations and depressions. The largest possible horizontal scale should be used to avoid errors in construction. Increasing the scale for altitudes will help to show these more clearly.

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[1] Projection Drawing, by H. F. Hughes, *Educational Screen*, vol. 13, pp. 128–129, May, 1934, is an interesting and detailed description of this type of pupil activity. It is well to note that with certain types of materials this activity represents a possibility of copyright infringement. With government maps there is no such possibility.

Electric Map.—In an electric map the elements one desires to emphasize—trade routes, railroad or steamship lines, communication systems, cities, mountain ranges, coastlines, bodies of water, specialized industries, models of buildings, natural phenomena, etc.,—are illuminated by electric lights placed under or behind them. Obviously, it is possible for one map to represent quite a variety of these elements, either by the use of different colored lights or by different electric circuits, and so be utilized in a number of instructional settings. This type of map is also used increasingly in science models and exhibits.[1]

Pictorial Statistics Map.—Conventionalized symbols—pictures, photographs, drawings, or prints—are used in this map to represent activities, occupations, natural phenomena, animal life, climatic conditions, industries, products, historical data, and other types of elements. Many of the ancient maps were pictorial but not statistical. The reader has probably seen reproductions of nautical maps in which a drawing of a fish represented the sea.

Confusion in the pupil's mind is often caused by the use of this type of map because (1) the scale of the area is so different from the scale of the objects, and (2) the pupil soon discovers that the map is inaccurate; for instance, mining, represented by a miner, excludes reflections of other occupations on top of the land, such as farming, fruit growing, or lumbering. Sometimes the second possibility is obviated by the use of more than one figure.

Decorative Map.—Increasingly schools are utilizing appropriate wall space for permanent tiled or painted representations, usually showing political divisions or geographical influences and relationships of considerable local significance. An artistically conceived and executed decorative map may have an aesthetic influence on the pupil as well as provide him with factual data.

The Atlas.—The atlas is a comprehensive geographical encyclopedia including maps of various kinds, pertinent statistical tables, historical accounts, photographs, diagrams and other types of illustrations, gazetteers, and other informational devices. In a recent development the atlas is kept perpetually up to date by semiannually published sets of replacement maps. The importance of this development is evident when one considers the fact that every year world changes affect about sixty-four maps.

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[1] A description of how an electric map, showing specimens of butterflies, is made will be found in E. C. Dent, "The Audio-visual Handbook," rev. ed., pp. 32–34, The Society for Visual Education, Inc., Chicago, 1939. See also L. A. Heathershaw, Simple Directions for Making Visual Aids, *Educational Screen*, vol. 12, pp. 16–22, January, 1933.

Pupil-made Maps.—Some teachers and administrators have criticized pupil-made map projects, pointing out that such experience is too limited to be of any great practical value, and too time-consuming to represent a good investment of pupil efforts. Doubtless, in some instances, these criticisms have been well deserved. However, on the other hand, it is as logical to believe that a purposeful, well-planned, and efficiently carried out project in map making is as valuable as letter writing, picture painting, garden planting, flower raising, furniture or equipment making, scrapbook assembling, newspaper publishing, play producing, and other similar projects commonly promoted by pupils.[1]

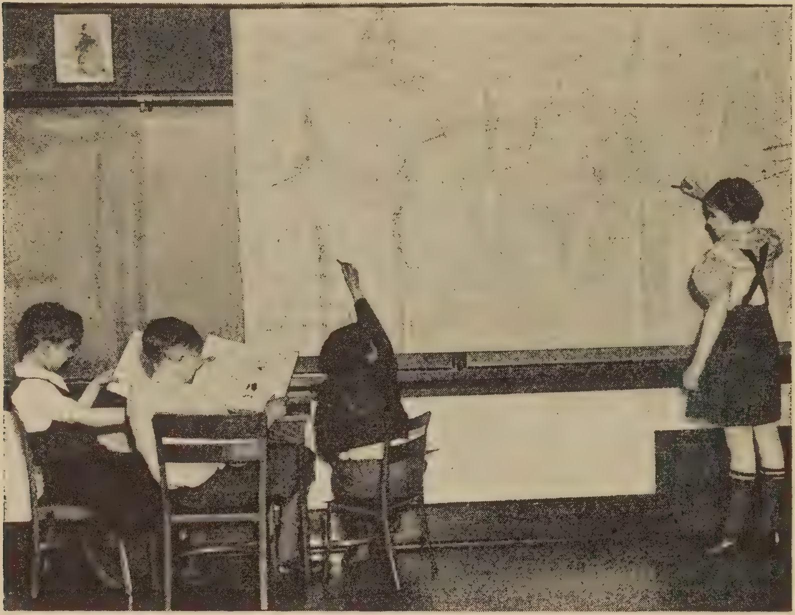

Fig. 27.—These nine-year-old Springfield, Missouri, pupils are recording the results of their study of communication on an outline map of the world.

There are two types of map-making projects, one in which the main emphasis is on the participants' immediate training in map ideas, concepts, relationships, words, expressions, implications, and applications, and the other in which the emphasis is placed on producing materials for use by other pupils both now and later. Because of its demands for accuracy and high-grade workmanship, this latter type of project represents also a valuable individual educative opportunity.

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[1] An excellent article is H. H. Shoen's, The Making of Maps and Charts, "Ninth Yearbook," pp. 83–98, National Council for the Social Studies, 1938.

However, the purpose of these projects is never to train professional map makers. Rather it is to provide for the learning of certain important facts and conditions of geography, history, science, economics, occupational pursuits, etc., in a natural, practical, motivated, and integrated educational setting.

As was pointed out at the beginning of the chapter, even the infant is a map maker. When he staggers a few steps in his earlyat tempts to walk, he is making and using a map, crude and mental though it may be. Later he learns in a general way the direction of the school and its distance from his home. Upon entering it he soon learns the position, size, and arrangements of the doors, windows, office, steps, drinking fountain, his own seat, the teacher's desk, and the washroom. All this represents map making and using. Still later in making school trips, both actual and imaginary, to local and more distant objectives, in helping to construct a model of a bridge, farm, or village, and even in studying his more formal subjects such as reading, he is still making and using maps. And he will continue to make and use them as long as he lives. What would be more appropriate then, than to have him put into more definite shape the principles and practices by which he will always be guided? And such efforts will also help him to understand more clearly and appreciate more completely the contributions of those who have made maps for his use.

Probably the simplest of pupil-made maps is that in which the child shows with a single line the route he travels to school. In a more complicated form of this he can show the streets used and crossed, car lines, distances, and some or all of the houses and buildings he passes. Another type of simple map is that in which the individual or group sketches the positions of the various items in the classroom—seats, desks, chairs, teacher's desk, door, windows, bookcase. In an extension of this idea the sketch can show the main elements of the building—entrance, steps, classrooms, corridors, office, washroom, gymnasium, and auditorium, or of the playground—trees, shrubs, gardens, walks, drinking fountains, bicycle racks, fences, apparatus, baseball diamond, basketball court, and other items. From these it is an easy step to the neighborhood map which shows community outlines, streets, main buildings, bodies or streams of water, bridges, car lines, railroad tracks, cemeteries, and parks. And similarly, later, projects reflecting still larger areas—county, state, nation, and continent can be undertaken. The simple beginning teaches the pupil the general purpose of maps, develops his spacial imagination, gives him a clearer conception of areas and their relationships, and so prepares him for further and more technical instruction.

Another type of project is the traced map which is made by the pupil tracing an outline over a printed map either on his desk or on an illuminated tracing table or on the shadows cast by slide, film, or opaque projection. In the latter type it is often both possible and desirable for a number of pupils to cooperate in developing the map. The projection is thrown on a large sheet of paper placed against the wall or blackboard and the pupils trace the outlines lightly with pencil, and, when these have been completed, retrace them with crayon, ink, or paint. If desired, pictorial representations may be cut out and pasted in the map or on its margins with lines to indicate their positions in it. Symbolic coloring may also be used. The use of a pantograph also results in an accurate tracing and has the advantage of decreasing or increasing the size while the proportions remain the same as in the original. Although this device can hardly be used by younger pupils, it can be utilized very effectively by the older. Pupils can easily learn to mount maps on cloth.

Relief maps, constructed either individually or by the group, represent another interesting and educative phase of map-making activity. The most logical point at which to begin the construction of such a map is some nearby area in which the surface is quite uneven. Preferably it should contain lowlands, highlands, a stream or two, and perhaps a body of water. The pupils, under the direction of the teacher, familiarize themselves with these elements, their respective sizes, elevations, and relationships, plan a scale, lay out the base area, and construct the map out of clay, sand, modeline, plastilene, paper pulp, salt and flour, or other plastic materials.[1] If desired, even trees, houses, bridges, railroads, highways, and other elements may be included. The map or the model may be painted in a very realistic manner. Titles, names, and designations, of which there should be enough but not too many, can be printed with colored pencil, ink, or paint, or pasted in with cutout letters. A rim around the baseboard gives an artistic definition to the map and also serves to protect it.

Standards for Pupil-made Maps.—Although the pupil-made map should not be expected to equal the product of a professional, yet it should have some caliber, be useful, and also represent a good educational investment of the time and efforts spent on it. E. Winifred Crawford suggests the following standards for evaluating these maps:[2]

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[1] The usual salt-flour receipt is two parts of salt to one of flour. The most inexpensive material is paper pulp, which is made by tearing up ordinary newspapers, soaking the pieces for two or three days, pouring off and squeezing out the water and working the material into the desired consistency.

[2] Crawford, E. W., Pupil-made Maps, "Thirteenth Yearbook," p. 227,

1. Have the children grown in their knowledge, appreciations, and understandings through making the map as one part of a study?
2. Can the children interpret the meanings indicated by the map, and not tell just the obvious?
3. Does the map
   - *a.* Have educational value commensurate with the time spent in making it?
   - *b.* Make clear its purpose to the observer?
   - *c.* Indicate that the materials have been evaluated?
   - *d.* Speak the truth?
   - *e.* Present an artistic appearance?
   - *f.* Indicate that efficient technics have been used?

As implied in these questions, a pupil-made map, even though interesting, can be a very expensive device as far as pupil education is concerned, and on the other hand, it can represent the opposite. Usually a map project that is carried out as a part of the work in connection with some subject or activity is preferable to one that is not so intimately tied up with curricular activities. In a word, maps help the pupil (1) to get ideas, and (2) to express his learning.

Standards for Manufactured Maps.—For several years an international committee of the World Federation of Education Associations has been assembling, analyzing, and discussing essential characteristics of maps, atlases, and globes for the various educational levels, elementary school through college. To date the following standards have been determined. Additional ones are being investigated and discussed.[1]

1. Meaningful title: Major Wheat Producing Areas of Latin America in 1935.
2. Scale: 1 inch equals 200 miles (accurate or approximate).
3. Key or legend: Each symbol (color, line, letter, dot, circle, etc.) used on the map should be appropriately explained.
4. Grid: a functional network of parallels and meridians either indicated at the edges of the map or drawn lightly across the map.
5. Sources of information from which data shown on the map have been obtained: U. S. Department of Commerce, "Foreign Commerce Yearbook," 1938, or Pan American Union, Washington, D. C.

Department of Elementary School Principals, 1934. This entire article, which describes how these maps are made and also how they can be used, is well worth reading in this connection.

[1] Standards used in the selection of maps are somewhat similar to standards used in the selection of pictures. These will be found on p. 113. A good reference is A. G. Eldridge, and others, Maps and Map Standards, "Thirty-Second Yearbook," pp. 394–405, National Society for the Study of Education, 1933.

6. Coastline continued to the edge of the map. For example, on a map of the United States the Canadian and Mexican coastlines should be drawn to the edges of the map.
7. Date: Whenever the information on the map makes it advisable or essential, the date of that information should be given. For example, Population Pattern of Europe in 1930.

If these characteristics are essential to good maps, then no drawing not possessing them should be labeled a map. Rather it should be designated a pictorial diagram or a diagrammatic sketch.

Preserving and Filing Maps.—Maps that are to be used more than once should be suitably protected from moisture, dust, misuse, and other careless handling. Some types of rolled fabric and paper maps and map sets come in cases that may be hung where they do not interfere with the use of the blackboard, bulletin board, or other equipment.[1] Rolled but uncased maps may be suspended horizontally on hooks or notched pegs. Such maps should never be piled on top of each other. Pupil-made maps and those that are not equipped with rollers may be fastened onto window-shade rollers, or on wooden dowels that may be inexpensively purchased at any lumber yard. Smaller maps, preferably mounted on some form of stiff cardboard and varnished or lacquered to keep them from being soiled, can be filed in shallow drawers or in the compartments of a filing cabinet. Globes and stand or tripod maps, when not in use, should be placed where they will not be shoved or knocked about, stumbled into, or needlessly moved and re-moved. During the longer periods of disuse, such as vacations, globes should be suitably covered. In order to make the maps easily available and to avoid unnecessary handling and unrolling, all maps should be clearly labeled with the title or the specific nature of their content and the grades in which they can be most appropriately used. Maps should be kept in good repair; the edges and the spring (in roller maps) require special attention.

A great variety of types and sizes of filing and mounting equipment, tripods, stands, cases, cabinets, rollers, holders, and hangers, can be purchased from almost any map publishing company. If it is impossible for the school to buy these, the older boys and the teacher, or the shop department of the school, can make the simpler forms, getting the necessary basic ideas and plans from the pictures and descriptions in the catalogues of the commercial map companies. If this pupil-made equipment is carefully designed and attractively constructed and colored, the pupils' emotional attitudes will be more conducive to happy learning than if the maps are wrapped around sticks or sawed-off broom handles and carelessly thrown onto a shelf or into a closet.

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[1] A disadvantage of nonremovable cased maps is that it is difficult to use more than one map at the same time.

Utilizing Maps as Visual Aids.—The pupil must be taught to use maps as he must be taught to use any other educational device or material. Nearly all the suggestions made on the teaching of pictures (pages 115–119) also apply to the teaching of maps, and these need not be repeated here. The following additional suggestions are pertinent:

Ensure that the Pupil Comprehends the Purpose of the Map.—The pupil must be taught the purpose of the map—what it is for, why it is necessary, and how it is used. This basic concept must be taught in the lower grades of the school. And it can be taught, as indicated previously, by having the pupils draw simple maps of their routes to school, the arrangements of the elements of the classroom, building, playground, and the general community. Through such personal projects the map idea becomes meaningful, real, and vital. The formal maps used, preferably the political-physical, should be about as simple as those the child himself makes. As he becomes older and learns more about man and his environment and activities, the other types of maps, such as rainfall, population, temperature, economic resources, etc., become a necessary part of his learning materials because they help to explain these activities. In short, the pupil must very early be taught that a map is a device that will help him to answer many important questions concerning himself, his family, and his friends.

Promote the Development of a Favorable Emotional Attitude.—It is essential that a favorable emotional attitude or mind-set toward maps be developed. In general, when a pupil looks at a map for the first time he may (1) be discouraged or dismayed by its confusing looking details; (2) be attracted by its uniqueness, colors, or other characteristics; or (3) recognize that it offers answers to his questions or solutions to his problems. Obviously, the third of these possibilities represents the attitude that must be developed.

A map is a complicated and abstract composition of symbolic lines, masses, colors, and other elements and therefore it may be very confusing to the pupil who hurriedly attempts to understand it. If he fails to see meaning in it immediately he will quite likely experience a sense of failure, and consequently discouragement, and so erect a mental barrier against it that will be anything but helpful in his required consideration of it. If this reaction is felt once it is felt all the more easily in subsequent experiences with maps. And, of course, out of these reactions grows an antipathy toward all maps in general. The lesson here is clear: the pupil's first experience with a map must be highly successful; he must get something from it, and be thrilled over his personal achievement. This most certainly means that only simple maps, that are easily understood and interpreted, and so mastered by the pupils, should be used.

Allow Ample Time for the Pupil's First "Looks."—Probably the pupil will be somewhat thrilled by the new map with its unusual delineations and coloring, especially if it is very attractive, and this reaction, unless recognized and capitalized, may actually handicap his learning from and with it. As suggested in the section on pictures (pages 117–118), the pupil must be given plenty of time for a good "first" look in which he superficially surveys the entire map, and a good "second" look in which he centers his attention on the elements in it that for one reason or another appeal to him. No concentration on the teacher's points is possible until the pupil has had both of these "looks." Hence, it cannot be overemphasized that these first experiences must be unhurried.

Ensure That the Pupil Understands Map Symbolism.—The map is a form of expression like a sentence or paragraph, and, as in the case of these, the pupil must be taught to understand the conventional symbols of its practical elements—land, water, elevations, roads, bridges, quarries, etc., as well as its hypothetical elements—poles, equator, circles, parallels, meridians. Further, he must be led to appreciate the relationships of these to seasonal and time changes and climate, and these in turn to man's life and activities. To learn to associate these locational facts with human activities is no easy task, and consequently here again plenty of patience and time is necessary. Leading the pupil in his attempts to visualize the abstract must not be done in high-pressure fashion; not too many symbols should be introduced at any one time. An abstraction of which he does not have a correct mental image, even though he can glibly define it, is still an abstraction.

It goes without saying that the pupil must see beyond the symbols on the map. He must see beyond the dot that represents London, the wavy line that represents the Mississippi River, or the colored patch that represents lowland France. These are still abstract and meaningless symbols until he sees peoples producing and consuming, working and playing, living and dying, and understand how and why they produce, consume, work, play, live, and die as they do. He must read himself into the map as a sort of visitor or traveler before he is able really to interpret it properly and beneficially. In fact, taking imaginary trips with the early and later explorers, as well as with his group to the various parts of the modern world, will help to give meaning to maps and make them more useful.[1] The liberal use of other aids—photographs, pictures, stereographs, slides, films, graphs, and posters—will help to explain, enrich, and supplement the map and so facilitate more happy and satisfying "travels."

Use Maps at the Opportune Moment.—In general, the map should be used when it is most needed to answer questions, solve problems, or supply information or data. It is not something to be taught apart from subjects, but like an experiment in science, it is an integral part of the work in a subject. In such a setting it becomes meaningful, functional, and vital. Studying a map apart from such an actual situation easily becomes an academic or artificial stunt or chore—a sort of "busy work"—that lacks purpose and life.

GRAPHS

The graph, an accurate representation of quantitative data, is widely used in showing comparisons, trends, developments, and relationships. Even at best statistical data are somewhat confusing and discouraging, and the function of the graph is to present them clearly and interestingly. The most commonly used types of graphs are the pictorial, line, bar, area, and diagram.[2]

Pictorial Graph.—This graph is attractive because it is pictorial in form and it is easily understood because fundamentally it is so simple. In fact, it has often been called the "international statistical language." In it a number of quantities or elements, varying from one to billions, are represented by a basic self-explanatory and appropriate symbolic figure—cow, automobile, man, ship, railroad car, or bale of cotton—and the total quantities are shown by the proper number or multiples of this symbol. A key indicates the numerical value of each unit. Titles, legends, labels, and textual explanations are used to define the general field, the pictorial representations, and the other elements included. Numerous ingenious forms of the picture graph have been devised, such as animated or demountable charts, maps onto which symbolic items may be pinned or hung, and magnetic charts onto which these symbols are held by magnetism. However, irrespective of the form, this graph is valuable in giving general round-number impressions of quantities for comparative purposes. It is not designed to show accurate measurement. From its simplest form, in which each symbol represents one unit, to its more complex, in which each symbol represents a great number of units, this type of graph is used in a great variety of settings to teach and show number concepts and their interrelationships. Here again, the simpler forms can be easily and enjoyably made by the teacher and her pupils.

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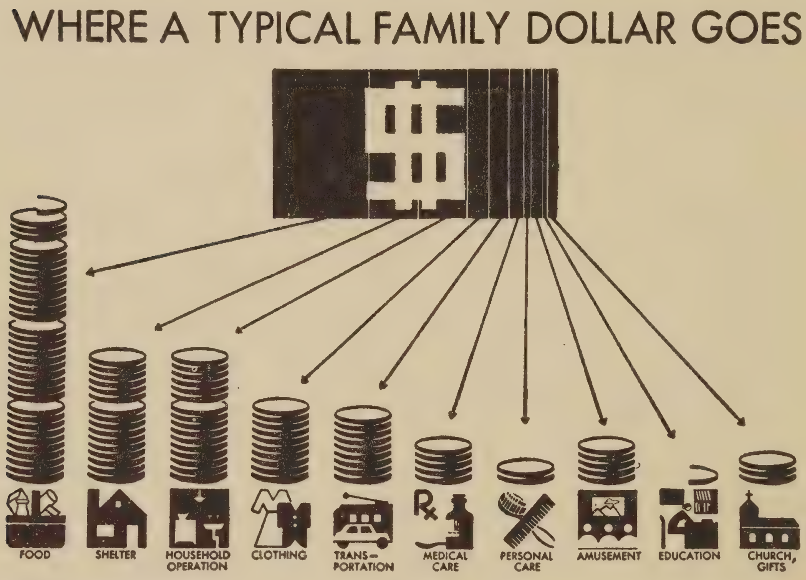
[1] See p. 87 for a discussion of imaginary trips.

[2] A combination map-graph, often used, is made by superimposing a graph on a map.

Line Graph.—This, one of the most accurate forms of the graph, is made by determining on a grid, represented by vertical or horizontal lines showing two scales of values, the points which denote the various values to be represented and then connecting these points. The two scales of values are usually placed at the left and the bottom of the grid. The line graph is widely used in the industrial and commercial world because it shows trends, which include the elements of time and quantity, so clearly. If several curves are shown on the same grid they are usually made in different types of lines or colors in order to differentiate them, a key being used to define each. In teaching this graph special care is required to ensure that the pupil both understands its meaning and appreciates the significance of the data shown. One good way to teach the basic principles of the line graph is to have the



Each coin represents one penny

PICTORIAL STATISTICS, INC

FIG. 28.—This pictorial representation is more interesting and meaningful than a column of percentages. (*From "How We Spend Our Money," Public Affairs Committee, Inc.*)

pupils keep records of such things as daily temperature or their daily marks, and graph them later.

Bar Graph.—The bar graph is probably the simplest and most easily understood type of graph. Broad lines, bars, or narrow rectangles are drawn to indicate the values, in terms of a common scale, of the various items charted—distances, weights, heights, sizes, quantities. All of these bars start from the same base which usually represents zero. The bars may run either vertically or horizontally. The latter are usually more easily read because the pupil reads them naturally, from left to right, as he does the text on a printed page. The scale of values is placed at the bottom in a horizontal, and at the left in a vertical, arrangement. Although it may add a distracting element, these parallel bars may be colored, cross-hatched, and differentiated in other ways. The two possible weaknesses or disadvantages of this type of graph are, (1) the units on the scale may be so large that the pupil obtains only a general idea of the comparisons, and (2) if the scale used is small, the bars may be so nearly the same length that relatively little difference is shown. This type of graph can be very easily made by the pupils.

Area Graph.—In the area graph differences in quantity are shown by differences in the size of the areas that represent these quantities. There are two main forms of this graph, the circle or pie chart and the areal figure.

In the pie-chart type the divisions, usually represented by means of color, cross-hatching, or shading, represent percentages or proportional parts of the entire circle area. Although this graph is designed to represent a general idea of the relative size of the quantities rather than technical accuracy, yet the exact percentages and even the numerical values may be written onto each segment. This graph is commonly used to give pupils their first experience with the larger fractions—halves, quarters, and eighths, because it is easy to teach the relationships of these parts to the entire circle by drawing in the segments, and also by cutting them out, comparing them by laying them on top of each other, and reassembling them.

In areal figure graphs separate figures—circles, squares, or rectangles—are used to represent the different quantities. Obviously, because these figures are not proportional parts of a whole, and also usually are not superimposable on each other, this form of graph is rather difficult to understand and interpret. It has the possible advantage of being pictorial, but even this is no real advantage unless the facts depicted are lucidly shown. If multiples of the basal areas are used, the proportions may be a bit more clear.

DIAGRAM

Because it can be used so advantageously in conveying ideas, the diagram is probably the most important of all types of graphic representation. From the rough one-line sketch drawn in the dust of the road to show the location of a certain individual's house, to the hundreds of carefully drawn sketches that together represent the plans for a great ship, skyscraper, bridge, or machine, the diagram is an indispensable device for showing the arrangement and relationships of the essential elements of a setting, device, or process. It is commonly used by the teacher in her blackboard explanations and by the pupil in his paper expositions. Even many gestures, especially those denoting direction, size, height, relationships, power, and force, are fundamentally but pantomimed or dramatized diagrams.

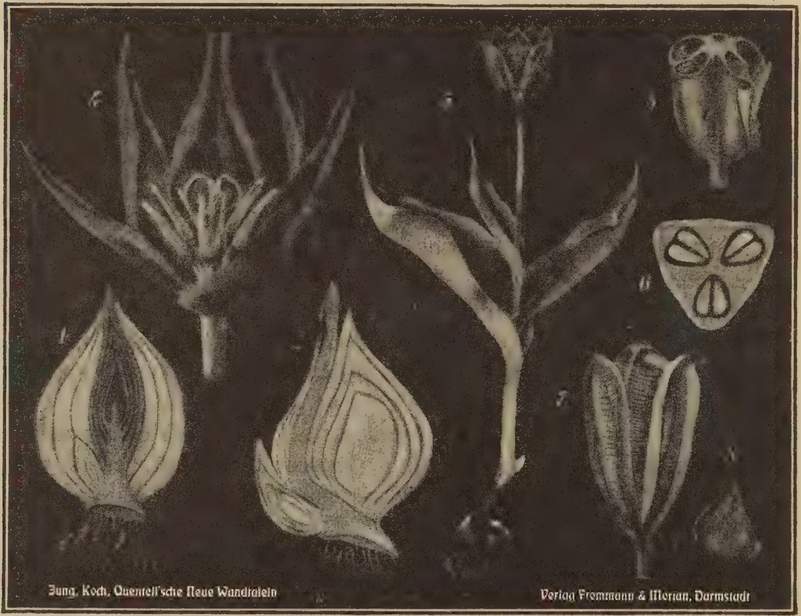

Jung, Koch, Quentell'sche Neue Wandtafeln
Verlag Fromman & Morian, Darmstadt

Fig. 29.—A botany chart showing the various parts of the tulip. (*Courtesy of A. J. Nystrom & Company.*)

The diagram is one of the most complex, perhaps the most abstract, of graphic representations because an understanding of it depends upon so many varied symbolic elements. To an individual who has never seen one before and who, consequently, does not know how to read or interpret it, even a simple blueprint is a very complex thing. And to the individual who lacks the proper background of experience or knowledge, a chemical reaction or a mathematical formula is unintelligible.

A good diagram is first of all technically correct; it is correctly and neatly drawn in proper proportion and suitably and completely titled, labeled, and explained. Nothing is left to the imagination. In the second place, it is artistic because it must command the pupil's respect and so encourage the development of a favorable mind-set towards it. An effective diagram can rarely be drawn freehand; a somewhat skillful use of such equipment as rules, compasses, straight edges, protractors, curves, and stencils, is necessary.

Needless to state, if the diagram is abstruse the teacher must use the utmost skill (1) to develop a proper emotional attitude or mind-set towards it; (2) to explain or interpret it; and (3) to make a definite application or correlation of it. Generally speaking, the pupil should have an adequate "first look" which, as has been pointed out previously, gives him a proper initial impression of the thing as a whole in its functional relationships or setting. He should see the item—house, locomotive, manufacturing process, chemical reaction, submarine, solar system, natural development, legislative session, or business organization, first as a complete functioning entity either in its original form or in a pictorial or model representation. Following this first look the details of organization, operation, construction, and relationships can be shown more easily and they will be the more meaningful. This is the so-called "psychological" approach in learning. Further, the use of other types of aid, graphic as well as pictorial representations, will be found helpful in conveying a complete and accurate conception of diagram.

ILLUSTRATIONS

Genetically, anything used to clarify meaning is an illustration. However, for our purposes here illustration means a graphic or pictorial representation, either realistic or symbolic. In its realistic form it is a sort of model, reproduction, or representation of what has come to be accepted as the original. A photograph is usually a more or less accurate representation, but some things, such as, for instance, a primitive man or a prehistoric animal, cannot be photographed. However, from one source and another we have derived ideas of how this man and animal looked and can therefore now represent them probably accurately. Nor can we photograph Santa Claus or Uncle Sam because they do not exist; but we can represent them graphically, that is, we can use symbols that have come to be accepted as representations of them. Of course we can and do photograph other photographs and graphic representations.

Further, drawn and painted illustrations can often be used more effectively than photographs. Note for instance how the commercial advertiser uses drawn illustrations instead of photographs which would be just as easy to reproduce and much more accurate. However, the advertiser wants to stress certain elements in his products and he does this by eliminating or subordinating the nonessentials and magnifying or emphasizing the ideas he wishes to "get across." Even when he uses actual photographs he usually "doctors" them for this same purpose.

The term "illustration" as commonly understood refers to paintings, photographs, etchings, drawings, and engravings, or graphic reproductions of them, which tell a more or less complete story by themselves. Because these are easily and inexpensively produced the pupil has at his command a great array of excellent materials which he did not have a few years ago. But this is only one type of illustration. A second type is verbal and not pictorial in character. Good examples are chapter and paragraph headings, and textual footnotes. The difference between these types is easily recognized. The purpose of the first type is to give a better understanding of textual materials; the purpose of the second is to center attention on the textual material, or define it, and so develop a comprehensive and receptive mind-set towards it.

In one way illustrations are still pictures and as such can be selected largely on the basis of the criteria suggested in connection with these. Further, they can also be used in much the same way. Consequently there is no necessity for a repetition of these standards and methods of use. They will be found on pages 113–119. The discussion of textbook illustrations on pages 110–113 is also pertinent.

CLASSIFICATION CHARTS

Several of the aids discussed in this chapter, such as maps, graphs, diagrams, and cartoons are types of chart. However, there is another group of these devices which, for want of a better and more accurate name, we designate as classification charts. These are analytical in nature; they depict the sequential arrangements or interrelationships of their various elements. The three most commonly used types of this chart are the table, the genealogical, and the flow.

Table Chart.—The railroad timetable is a good example of this type of chart. In it the various cities or stopping places are arranged in proper order and the times at which the trains stop at each is indicated. The chronological chart, which lists, in their properly dated sequence, great inventions, discoveries, explorations, acquisitions of territory, wars, developments, presidential administrations, and other events and data, is another example. Slightly different from these are such charts as a typical financial record showing gains and losses, and a report showing a comparable list of advantages and disadvantages of a process, machine, product, or other item. The use of titles, labels, columns, lines, arrows, numerals, colors, large and small and light and heavy type, diagrams, illustrations, pictures, maps, appended explanatory notes, and other devices help to clarify the material and so make it more readable and meaningful.

Genealogical Chart.—This type of chart is used to show growth or development. In the "tree" form the origin is a single line, rectangle, circle or other representation of the "trunk," and the various changes or developments are shown as the "branches." Two examples are: (1) the development of a single store into a nation-wide chain of stores; and (2) a pedigree in which ancestral descent from two individuals is depicted. In the "stream" type this order is reversed, the origin being represented as small tributaries which unite ultimately to form the single "stream." Two examples are: (1) a chart showing how the various accretions of American territory finally resulted in the United States as it is today; and (2) a chart showing how the discovery or invention of various principles, forces, and devices finally resulted in the airplane or the radio.

Flow Chart.—This shows organizational elements and their functional relationships. Examples are the charts showing the various legislative, executive, and judicial departments of the government and their interrelationships, and the organization of a board of education, political committee, newspaper staff, or city administration. The various elements, properly named or designated by lines, rectangles, circles, or other graphic representations, are connected by lines showing the directional "flow" of the organization.

THE POSTER

This type of visual aid, which varies in form from a simple printed card to a complicated and highly artistic picture, is designed (1) to make an instant appeal; (2) convey a single main idea or at most a very few ideas; and (3) usually to be seen and understood at a distance. Common examples are the billboard or glorified poster, cafeteria menu, magazine cover, book jacket, postage stamp, and car and show-window cards. Although the poster may represent almost any type of material from the concrete to the abstract, like the cartoon it must be clear enough to be understood at a glance. Nearly always some text is included in graphic posters but this is kept short and simple so that it may be quickly and easily read and interpreted. Often the poster includes maps, charts, graphs, diagrams, photographs, and other types of pictorial representation.

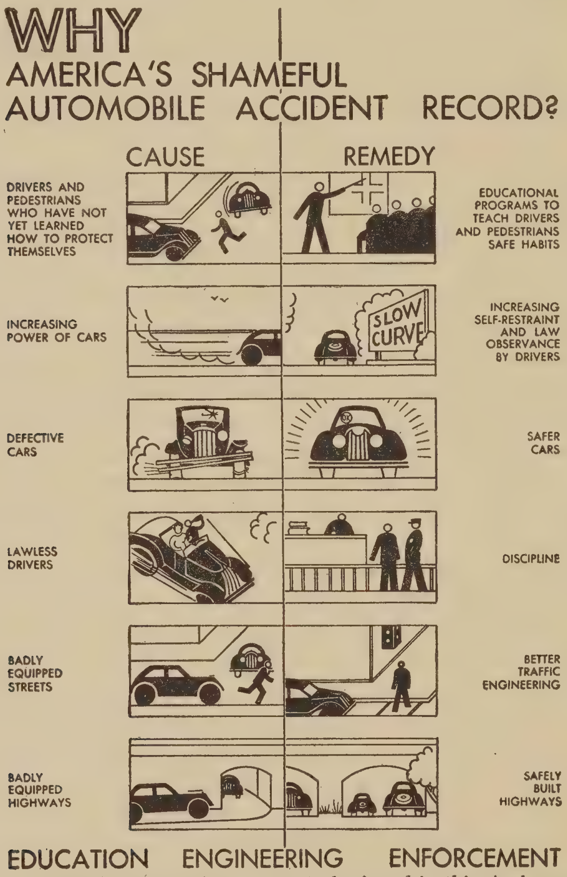

WHY
AMERICA'S SHAMEFUL
AUTOMOBILE ACCIDENT RECORD?
CAUSE
REMEDY
DRIVERS AND PEDESTRIANS WHO HAVE NOT YET LEARNED HOW TO PROTECT THEMSELVES
EDUCATIONAL PROGRAMS TO TEACH DRIVERS AND PEDESTRIANS SAFE HABITS
INCREASING POWER OF CARS
SLOW CURVE
INCREASING SELF-RESTRAINT AND LAW OBSERVANCE BY DRIVERS
DEFECTIVE CARS
OK
SAFER CARS
LAWLESS DRIVERS
DISCIPLINE
BADLY EQUIPPED STREETS
BETTER TRAFFIC ENGINEERING
BADLY EQUIPPED HIGHWAYS
SAFELY BUILT HIGHWAYS
EDUCATION ENGINEERING ENFORCEMENT

Fig. 30.—Consider how many lessons are to be found in this single page of graphic representation. (*Prepared for Traveler's Insurance Company by Pictorial Statistics, Inc.*)

Posters may be obtained from a variety of sources such as travel companies, industrial and commercial concerns, libraries, museums, printing and supply houses, chambers of commerce, fairs and exhibitions, theaters, and government offices, or they may be made by the pupils themselves. Even though the artistic requirements of a good poster are high, the materials are easily available and inexpensive; the illustrations—drawn, painted, photographed, or clipped, and the text—drawn, painted, or made of large letters clipped from newspaper headlines and magazine titles or obtained from print shops or supply houses, may be very easily and attractively composed on construction paper or illustration board.

These aids are not only effectively used in advertising and promoting such school activities as thrift, safety, courtesy, and other drives and campaigns, and athletic, music, and dramatic events, but also in connection with the teaching of arithmetic, reading, spelling, geography, music, history, science, and all other subjects in the curriculum. Often it is desirable and necessary to utilize pictures, slides, maps, charts, and other types of aid, as well as verbal instruction, to provide additional details and information. An attractively designed, executed, and displayed poster that can be looked at again and again can have a cumulative educational effect. And a series of progressively constructive posters can be very effective in developing an idea, principle, or concept.

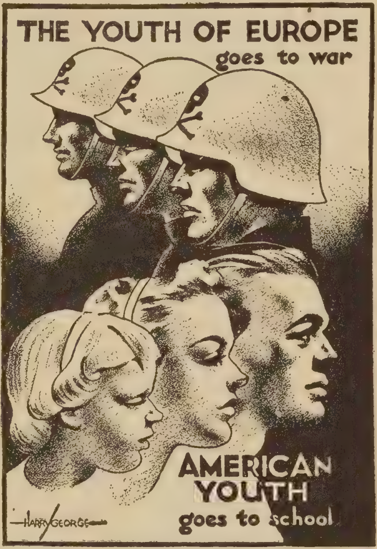


Fig. 31.—The cartoon tells a story instantly and vividly. (*Courtesy Harry George, a student in West Technical High School, Cleveland, and the West Tech Tatler.*)

THE CARTOON

The cartoon is similar to the poster in that it makes an instant appeal and conveys a single main idea, but differs in that it is usually not so large and, more important, in that it treats a topic less seriously. It utilizes various forms of vigorously presented, dramatized, and personalized humor, satire, absurdity, and even often downright exaggeration. Because of its uniqueness and simplicity it can be effectively used in appraising, interpreting, and emphasizing. Most commonly the cartoon is used in connection with such fields as politics, history, geography, economics, and sociology, but increasingly it is being utilized in commerce, science, literature, and mathematics.[1]

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[1] A good treatment of the cartoon in the social studies will be found in D. C. Knowlton, "Making History Graphic," Charles Scribner's Sons, New York, 1925.

The cartoon is symbolic and therefore usually highly abstract. Consequently, in material, execution, and implication, it must be simple and clear or it will be unintelligible.

The important ideas in teaching with cartoons are (1) to ensure that the pupil understands the point being made—that he comprehends the symbols used and correctly interprets their implications; and (2) that he himself evaluates the point of view being presented. As suggested above, a cartoon is often an inaccurately or improperly emphasized and exaggerated treatment of a point of view and therefore the pupil must be taught to recognize that ridicule, even though strikingly presented, is not argument. A cartoon that represents a concept or idea to which the pupil does not react intellectually, that is, does not think or reason about, weigh, and evaluate, is a cartoon wasted.

THE BLACKBOARD

The introduction of the blackboard into American schools, which came less than a hundred years ago, was due largely to the influence of Horace Mann who had observed how it was used in European, and particularly in German, schools. However, despite the fact that it is now standard equipment in all schools, it is surprising to know that so few very definite attempts have been made to teach the teachers how to use it. Appropriate instruction in teachers' courses is extremely limited, and relatively few articles have been written on the subject. With the present emphasis on visual instruction the blackboard will doubtless receive its share of attention and so become a more effectively used teaching device.

Uses of the Blackboard.—The blackboard is an essential part of teaching equipment. It is valuable in at least four ways; (1) because of its size and location it can be used advantageously for group instruction; (2) it provides opportunities for closely supervised, and teacher-and-pupil-evaluated, pupil activity; (3) blackboard writing and drawing intensify pupil interest and attention; and (4) it is economical because it can be erased and used repeatedly. Although changes in teaching techniques and the invention and development of duplicating machines have somewhat decreased its usefulness in individual instruction in certain types of work (as will be illustrated below), yet it is still widely used for this purpose.

The blackboard offers many educational opportunities, in all fields —curricular and extracurricular—in connection with the presenting of facts, principles, processes, and procedures; making assignments of lessons and individual responsibilities; listing questions, problems, sources, and references; giving directions, examinations, and tests;

practicing individual drill or creative work; and in posting notices, announcements, and pertinent class and pupil records.

Types of Blackboards.—Blackboards are usually made from slate, glass, porcelain, and several types of paper and wood composition materials. Usually they are black, although colors are now being experimented with. In any case it is essential that the board and the crayon represent a sharp contrast in color. Movoble blackboards, so constructed that they can be carried from one place to another, slid, raised, or lowered, are being increasingly used. The three latter types not only allow for the use of the space behind them but also provide for the use of the front space for projection or other purposes. Other types of blackboard—outline map, music staff, cross-section, and graph—can be used to advantage in certain kinds of work. The general trend is toward a smaller amount of blackboard space in the classroom.[1] Blackboards are used constantly and therefore they, as well as the troughs and erasers, require frequent cleaning and attention. They should be kept in good repair. A broken, chipped, or cracked board represents an inefficient aid because these blemishes decrease the accuracy and readability of the material placed on it and further, they also decrease the pupil's respect for it and his interest in the material represented. Exhausting attempts to comprehend material presented under handicaps, and a consequent unfavorable attitude, usually result in careless and poorly done work.

Using the Blackboard.—As in the case of all other aids, if the blackboard is to be used successfully in the development and checking of correct mental images, it must be used wisely and efficiently. All blackboard representations should be definitely and immediately purposeful; meaningless scrawlings are confusing and distracting, and are evidences of the teacher's lack of skill in blackboard work. In order to be easily readable, attractive, and respect-deserving, the material should be neatly, clearly, and accurately reproduced, and with at least a minimal degree of artistry. Not too much material should be used at any one time because this not only clutters up the board and gives it a messy and unappealing appearance but also tends to reduce the scale used and so makes it less intelligible. In order to show contrasts, or to add to general attractiveness, colored chalk or crayon, or, for more permanent presentations, water tempera paint, should be used. Needless to state, the teacher or pupil demonstrator should take a position where he or she will not interfere with the pupils' clear vision of the material being presented.

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[1] One of Goins's conclusions, following his study of the use of blackboards by high-school teachers was, "The data indicated that a considerable portion of the blackboard space which has been provided for classrooms is unnecessary." (See the bibliography for reference.) The present writers believe that what he should have said, and probably what he meant to say, is, "The data indicated that a considerable portion of the blackboard space provided for classrooms is not being used." These two ideas are certainly quite different. Teachers are not taught how to use the blackboard.

Generally speaking, erasure of material not needed should be complete in order to avoid distraction; and any erasure should be made with the eraser or cloth and not with the hand or fingers.

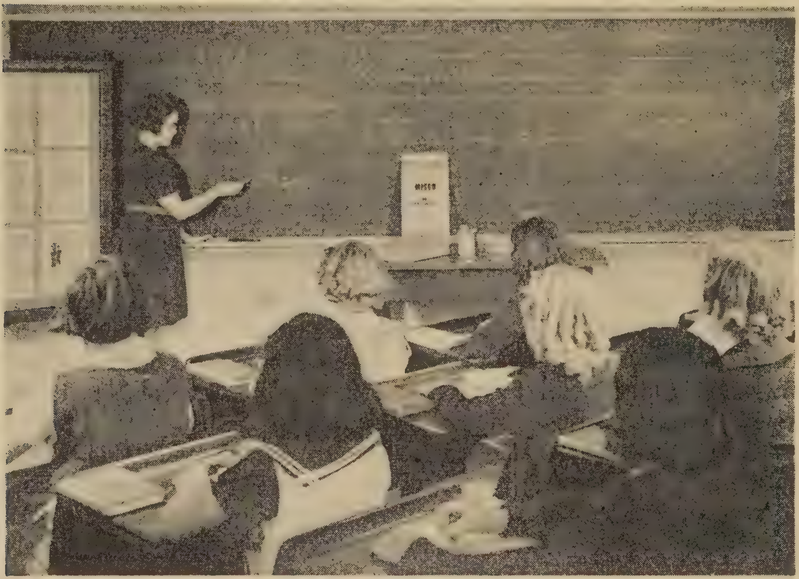

Fig. 32.—If intelligently used, the blackboard is profitable in both individual and group work. (*Courtesy of Hamburg, New York, Public Schools.*)

A very common practice that should be avoided is the pasting of material over the blackboard. This practice limits the amount of space available and also usually reduces aesthetic appeal.

If outlines, summaries, or similar materials are to be used by the group immediately, they should be placed on the board before the class enters or is ready to use them. If the teacher writes on the board while the pupils are waiting, she wastes their time while they wait, and, in case they are supposed to copy the material, they will be handicapped by the teacher's position in front of the board. Also, if the material is on the board when it is needed, the teacher can profitably use her time in explaining points or answering questions that may be raised. Incidentally, in this connection it is well to emphasize that the copying of long assignments, outlines, and lists of problems or questions represents a waste of the time of both teacher and pupil. These should be mimeographed and a copy given to each pupil.[1]

THE BULLETIN BOARD

The bulletin board, like the blackboard, can be effectively used in connection with every learning situation in the school, and if intelligently handled it will (1) motivate, supplement, and enrich learning; (2) provide intriguing educative opportunities for pupil participation and cooperation; and (3) serve as an advertising and promotional medium for all school interests, causes, and activities. Frankly, there is no excuse for a school not having at least one general bulletin board (many schools have several), and for a teacher not having a specialized board for the use of her own group or groups.

The types and the number of really attractive and beneficial materials that may be displayed are numerous: advertisements, announcements, reports, assignments, booklets, bulletins, cartoons, charts, clippings, correspondence, creative projects, cutouts, diagrams, drawings, graphs, informational items, maps, news, notices, pamphlets, photographs, pictures, poems, post cards, and posters. In fact, there is little that ever has happened or that concerns man and his environment and activities that cannot be reflected on the bulletin board.

Types of Bulletin Boards.—The boards may be classified as fixed, which are more or less permanently attached to the wall;[2] movable, which can be changed from one place to another; folding, which are composed of several frames that can be swung, that is, opened and closed like the pages of a book; and wire, a horizontally placed wire at the top of the blackboard or along the walls on which materials are suspended. The last mentioned type is appropriate for larger and less compact items such as booklets, posters, pictures, and similar materials. When hung on a wire, prints and similar paper items should be mounted on cards to preserve their shape and also to protect them from careless handling.

School Bulletin Board.—The general school bulletin board is used largely for the promotion of events and activities of interest to the school as a whole. On it are placed advertisements of music, dramatic, and athletic events, publications, and drives and campaigns; news concerning school organizations, activities, and people; notices and announcements; rules and regulations; and material appropriate for special "days" and "weeks." Classified exhibits of art, cartoons, poetry, nature study, science, geography, health, travel, courtesy, grooming, hobbies, and the like can be easily arranged. Further, it can also reflect interesting projects, activities and materials from the various classes. Interesting questions and conundrums, in which the question is asked one day and answered the next, puzzles, unusual information, and other interest-exciting devices add to the board's appeal.

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[1] In his investigation (see bibliography) Fildes found that 52 per cent of the teachers in his study reported that easy access to duplicating devices had decreased their use of blackboards.

[2] Blackboards that have a narrow bulletin board across the top (often too far out of vision) and at both ends are now being made.

Class or Subject Bulletin Board.—The class bulletin board reflects material of specialized interest to a particular group. Here again this device can utilize a great variety of types of material because the details of any subject relate, directly or indirectly, to all of man's activities and experiences. These displays can help to motivate, interpret, and supplement lessons, units, and subjects. Although a classroom bulletin board should not represent merely a collection of assignments and notices concerning lessons, reports, examinations, etc., yet there is a place for some of these.

Maintaining the Bulletin Board.—The bulletin board should be an attractive piece of school equipment, but often it is not. In many a school it is a disgrace. Often it is located in an unattractive and unilluminated place, and covered with a miscellaneous collection of more or less obsolete material carelessly designed, executed, and arranged, and fastened with an indiscriminate assortment of tacks, nails, pins, and paste. A little intelligent effort would certainly improve this device in almost any school.

The making and maintenance of a bulletin board represent an excellent school, student-council, or class project. A Bulletin Board Committee is first selected and organized. This committee makes an investigation of the possibilities—materials, number, size, frequency of posting, space available, and other details—in order to determine the size of board required. This board should be large enough to allow for growth or miscalculation but not so large that it cannot be kept fairly well filled with vital and up-to-date materials. In most cases the group will make it too small rather than too large. It may be made of cork, soft wood, Celotex, or similar material. An attractive back can be made of billiard cloth, which does not show tack holes, mounted on a soft board. A frame, appropriately and artistically decorated, may run around the edges. If desired, a hinged glass enclosure, fitted with a lock, may be made. This board should be hung in an accessible, attractive, and well-illuminated place.

The committee studies the science of display, promotes the production of, and evaluates, selects, and posts material.[1] It makes up a set of rules or regulations concerning the size, shape, form, content, and dating of all materials, has this neatly typed or printed, and posts it on the board. This group then keeps the board up to date by removing old material, maintaining a file, and scheduling material for future posting. It devises motivational plans whereby the pupils are spurred to "make the bulletin board"; and, from time to time, it promotes a class evaluation of the organization, completeness, and effectiveness of the bulletin board's display. Naturally, this committee works hand and glove with the teacher.

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CHAPTER VI

FLAT OR UNPROJECTED PICTURES

From the time when he first drew pictures in the sand or scratched symbols on rocks, through the many developments and uses of papyrus, paper, canvas, marble, pen, ink, brush, paint, and chisel, to the present, when he utilizes it in a wide variety of startling photographic representations, man has always found picturization an indispensable tool for expressing ideas or conveying information to others. Originally our written language was pictorial, and even today some of the older systems, such as the Chinese, are based on early pictograph characters. The development of alphabetic speaking and writing may have changed the emphasis and the types, but basically it did not change the necessity or the place of pictorial representation. Man still pictures. Imagine what it would be like if all pictured communication were eliminated from modern life. We should then have no illustrations, photographs, prints, or drawings of any kind, in newspapers, magazines, books, catalogues, and travel folders; no billboards, post cards, or motion pictures. The very fact that these picturizations are used so widely is evidence that industrial, commercial, and professional interests, which spend vast sums of money in preparing and distributing them, accept them as important educational devices. Too, what confusion would result if these pictorial representations were eliminated from our formal educational materials and procedures. Here, also, they have been widely accepted as significant instructional instruments, not only as aids, but also as important sources of information.[1]

Definition.—The "still" picture has been attractively defined by Emmert in these words: "The still photograph represents a cross section of a visual experience at the instant it occurs. It stops motion, shows line and color, indicates spacial relationships, and portrays people, objects, and scenes in which motion is not an essential feature."[2]

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[1] A good and recent discussion of the place of art in an educational plan and the modern methods of teaching it will be found in "The Visual Arts in General Education," D. Appleton-Century Company, Inc., 1940. This book is the report of the Committee on the Function of Art in General Education for the Commission on Secondary School Curriculum of the Progressive Education Association.

[2] EMMERT, W., Standards for Selecting and Evaluating Still Pictures, *Educational Screen*, vol. 16, pp. 317–318, December, 1937.

Commonly used types of the still picture are the so-called "flat" or unprojected pictures—photographs, prints, paintings, and stereographs, and projected pictures—slides and strip film. The former will be discussed in this, and the latter in the next, chapter.[1]

Values of Flat Pictures.—The values of the still picture are so well known that there is no need to do more than merely mention its place and advantages in instructional activity. As in the case of objects, specimens, and models, discussed previously, pictures provide opportunities for the obtaining of the basic visual imagery essential to thinking and living. They represent the raw material through which the pupil becomes acquainted with the elements of his environment, both immediate and remote. They help to provide in a vicarious way concrete experience with the individuals, events, activities, and things of the local community as well as those of other peoples, other sections of the world, and other times.

The still picture, one of the most universally used aids in education, is popular because (1) it is so real and vivid; (2) it is easily available; (3) it is convenient to use; (4) it is inexpensive; and (5) it can be used repeatedly. This last value is very important when one realizes that a picture is not something to be merely looked at and then passed by, but something to be analyzed, studied, thought about, and correlated.

Further, various types of combinations of still pictures taken of different elements of the same item can very realistically portray contrasts and comparisons; and taken at different intervals they can show continuity or the various stages in the development of the item—the construction of a house or an automobile, or the growth of a plant or flower: or they may show all three, contrast, comparison, and continuity, in one subject such as, for instance, the development of illumination or transportation.

TYPES OF FLAT PICTURES

Flat or unprojected pictures are of various types such as (1) photographs, prints, paintings, or sketches which the pupils may handle; (2) wall and bulletin-board pictures; (3) murals, frescoes, and billboard illustrations; and (4) textbook illustrations. These, with the exception of the third group which may be "borrowed" by pupil visits to the exhibits, may be purchased, rented, borrowed, or prepared by the teacher and the pupils.

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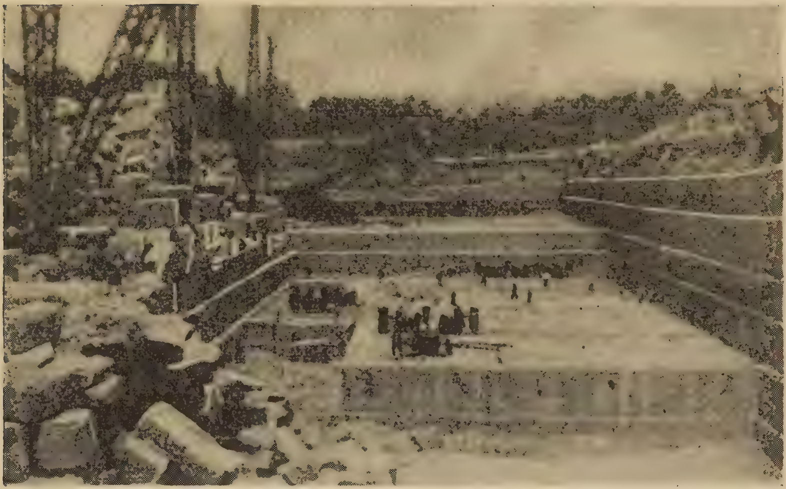
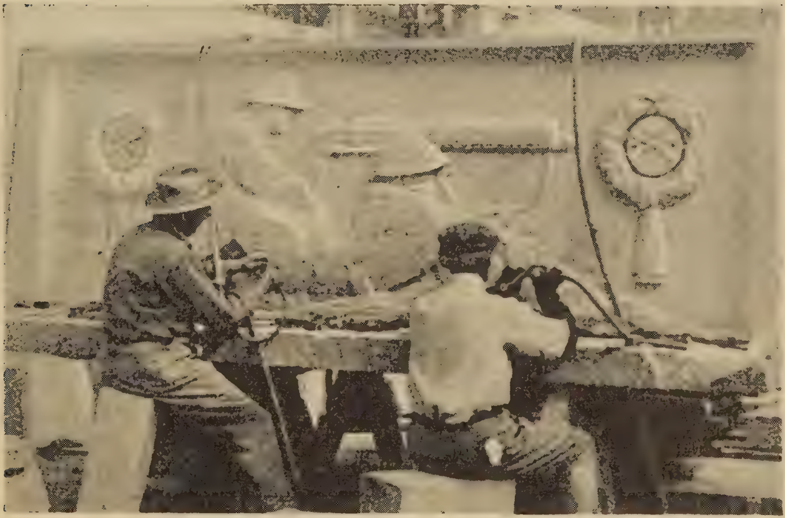
[1] Some teachers and writers classify maps, cartoons, posters, charts, and similar materials as "flat pictures." The authors prefer to designate them as "graphic materials," and therefore discuss them in Chap. V.



(*a*)



(*b*)

FIG. 33.—Pictures showing marble being quarried and sculptured with pneumatic tools will help the student to understand the processes and so better appreciate the many finished objects in his own community. (*Courtesy of Eastman Kodak Company.*)

Purchased, Rented, and Borrowed Pictures.—Purchased, rented, and borrowed pictures, which are available through a number of commercial and service companies, museums and libraries, and private individuals, usually represent careful selection and high-class workmanship.[1] The school can buy, rent, or borrow not only individual representations or reproductions but also articulated sets of from fifteen to twenty-five or thirty pictures, and even coordinated series of these sets. Frequently these sets contain teaching and using suggestions, and sometimes even more extensive textual explanation and supplementation. Protective jackets and envelopes and often even filing or indexing cards are supplied.

Perhaps there are only two disadvantages to purchased, rented, or borrowed pictures. First, although, if bought or rented, they are relatively inexpensive, yet they do cost something. Second, because they do not have a direct part in finding, deciding on, preparing, and mounting them, the pupils may miss a bit of somewhat valuable training, as well as the emotional thrill that comes through such participation. In general, however, a school can well afford to provide purchased as well as encourage the development of teacher-and-pupil-prepared pictorial materials.

Locally Prepared Pictures.—Although the teacher and her pupils cannot hope to rival expert professionals in taking, selecting, and preparing pictures for classroom use, yet they can learn to do these quite satisfactorily. And, as implied above, these activities, wisely planned and carefully supervised, can have educative value. Often the group can make a closer and better application of materials to its work by preparing instead of purchasing or renting materials. The emotional attitudes taken by the pupils because of their participation in a project are another outcome of value.

Sources of Pictures.—There are many sources from which pictures may be obtained easily and with little expense. Some of these are: newspapers, especially Sunday supplements and magazine supplements; magazines (both new and secondhand), such as *National Geographic*, *Asia*, *Mentor*, *Travel*, *Nature*, *Pictorial Review*, *Ladies' Home Journal*, *Look*, and *Pic*, as well as specialized professional journals;[1] commercial and industrial houses; chambers of commerce; transportation companies and services; state and federal departments, bureaus, and offices; libraries and museums; local amateur and professional photographers; and pupils and teachers of other schools in this and foreign countries.[2] The pupils themselves may take quite appropriate pictures. Most of this material is easily prepared for class use. Discrimination must be exercised in the selection and use of advertisements,[3] some of which may represent undesirable products as

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[1] See p. 370 for a list of these sources. The Photographic History Service, Chicago, distributes illustrations prepared from the "stills" of famous motion pictures such as, "The Ten Commandments," "Ben Hur," "Robin Hood," "Rasputin," "The Great Meadow," "Uncle Tom's Cabin" "Abraham Lincoln," etc. Each unit includes a full-page Introduction, at least fifteen well-explained photographs, and pertinent teaching questions.

Fig. 34.—Pictures clipped from magazines can be attractively mounted or made into booklets and used over and over again. (*Courtesy of Farm Security Administration, photograph by Lee.*)

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[1] An excellent article is J. P. Givler, An Undeveloped Mine of Materials for Visual Education, *Educational Screen*, vol. 19, pp. 53–55, February, 1940.

[2] International correspondence and exchanges are promoted by The Junior Red Cross, Washington, D. C., and The International Friendship League, Boston, Mass. The Club Exchange Department of *The Instructor*, F. A. Owen Publishing Company, Dansville, N. Y. is an excellent source for the names and addresses of groups wishing to exchange letters, souvenirs, pictures, products, magazines, books, and other objects.

[3] An article showing how advertisements were used in one subject and which is suggestive of how they may be utilized in connection with other fields is R. B.

well as misemphases and inaccuracy; but even a consideration of these will mean an educational opportunity for the pupils.

Making Pictures.—The simplest form of picture is a drawn one, but because of the incompetency of the pupils, it is hardly possible to produce it in quantity in the average classroom.[1] However, it is possible to make accurate silhouettes—to draw lines around and fill in the shaded areas of projected figures. All that is needed is paper, a pencil or pen, an object, and light. In an extension of this process, photogramming, an object is placed on a sensitized surface such as blue print or photographic paper, film or plate, an exposure is made, and the picture is then developed. A little experimentation with this inexpensive process will likely produce rather amazing results.[2]

Increasingly pupils are taking pictures, using equipment varying from the simplest bought or made pinhole camera to the more expensive camera. Pupil and teacher enthusiasts are found in nearly all schools and camera clubs in many of them. Certainly a setting in which the pupil photographer searches for and decides upon his subject, studies the relative importance of its elements, and then so photographs it that he brings out what he wants to emphasize, promotes discriminating observation. Here again, photography in its professionalized aspects is a highly developed and technical field and the pupil need not be expected to rival the expert. However, he can contribute much to the program, especially material that is particularly appropriate because it is of local interest and significance. Too, he can take pictures of subjects in other parts of the country while on a trip or tour, as well as those which due to climatic or other conditions are not available during the regular school year.[3]

Colvin, Advertisements as Teaching Aids in General Science, *School Science and Mathematics*, vol. 34, pp. 79–83, January, 1934.

[1] A good article dealing with two types of illustrations is W. Emmert, Standards and Techniques for Making Posters and Booklets, *Educational Screen*, vol. 13, pp. 248, 250, 252, November, 1934.

[2] An interesting description of "A Living Picture Book," from which the characters step out and speak, will be found in A. M. Gasslander's article under this title in *Educational Screen*, vol. 16, pp. 128, 130, April, 1937.

[3] In his article, Student Camera Crew Makes a "Scoop," *Educational Screen*, vol. 17, pp. 42, 44, February, 1938, E. E. Oertal tells how his group of high-school students produced a highly serviceable educational film on date cultivation in a territory that had never been commercially filmed for classroom purposes. An interesting account of a naturalist's night photographing trips will be found in F. S. Gehr, The Teaching of Wild Life near Home, *Educational Screen*, vol. 16, pp. 254–255, October, 1937. See also the bibliographical references to Gilman, Johnson, and Neblette, Frederick, and Hunter. A Brief Bibliography on Photography will be found in *Educational Screen*, vol. 16, p. 266, October, 1937.

Mounting Pictures.—Pictorial materials should be mounted in order (1) to enhance their attractiveness; (2) to make them more usable; and (3) to preserve them. A well-mounted picture, print, or clipping is more important appearing than an unmounted one and it is also more artistic because of the contrast between, or the blend of, it and its mount. It is more easily passed around, handled, and used; it can be laid down perfectly flat, stood upright, or hung up. It is more easily preserved from wrinkling, bending, tearing, or soiling, and too, it can be more conveniently filed than an unmounted item. Further, it is possible to mount several items showing comparison, contrast, or continuity so close together that the lesson they portray is all the more clear. Needless to state, any mounting must be carefully done in order to achieve these values. A poorly mounted print—one inaccurately cut, inartistically located, carelessly glued, or amateurishly labeled—represents a waste.[1]

Formerly pictures were mounted in a stereotyped fashion with uniform margins and mounts limited to four or five colors. Now there is much more freedom in these matters. Items may be mounted on construction or corrugated paper, strawboard, Bristol board, chipboard, illustration board, mat board, wood veneer, or metal, all of which may be purchased from almost any supply store. The mount should be durable, rough rather than smooth in order not to show fingerprints, and of a color that harmonizes with the print or emphasizes it. These mounts can be cut more accurately with a paper cutter than with scissors. Usually the storekeeper will cut them at a little additional expense.

The picture itself should be neatly and accurately trimmed. The margins, which are desirable in order to prevent the print from becoming soiled, and which may vary with the size and number of pictures being used, should be measured carefully and the boundary points indicated by a very light pinprick or pencil mark. The item may be fastened on with paste, liquid glue, rubber cement, or dry mounting tissue which melts when heat and pressure are applied. For temporary mounting spot-pasting is satisfactory, but for permanent materials rubber cement, which may be bought at any automobile supply store or tire shop, is probably the best because it does not curl or warp the picture, and it does not require a hurried application. In fact, within certain limits, the drier the cement is, the better it sticks. Both the picture and the mount are coated, allowed to dry, and then stuck together. The print may be smoothed out with a clean rolling pin. A neatly drawn line near the edge of the margin gives the product a finished and artistic appearance. All materials should be carefully and plainly labeled either in front or on the back depending on the space available and the length of the legend.[1]

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[1] More detailed directions than those suggested here for preparing and mounting materials may be obtained from any standard book on art instruction such as M. E. Mathias, "The Beginning of Art in the Public Schools," 1924, and "The Teaching of Art," 1932, both published by Charles Scribner's Sons, New York. A very practical article is M. E. Alexander, Preparing and Filing Mounted Materials, "Thirteenth Yearbook," pp. 194–198, Department of Elementary School Principals, 1934.

Fragile items, such as old letters, pictures, or documents, should be covered with glass or other transparent material. They may be put in a frame, case, celluloid jacket or envelope, or on the table under a piece of plate glass. Cellophane is satisfactory for this purpose if it is handled carefully to prevent bending or wrinkling.

TEXTBOOK ILLUSTRATIONS

Pictorial illustrations have been used for a long time not only in connection with verbal instruction but also in written educational materials. The famous "Orbis Pictus" of Comenius was literally a "picture book" as its title suggests. Our own "New England Primer" is another well-known example of early attempts to vitalize textual materials with picturization. Comparatively recently there have appeared two very clearly defined trends in textbook production that may be appropriately mentioned in this connection because the "flat" picture idea and practice are closely bound up with both of them.

The first trend is in the direction of more purposeful illustrating. Up until the last few years textbook illustrations, more or less carelessly collected or designed, were thrown into books in order to decorate or embellish them. Pages of solid text are usually somewhat discouraging to the pupil because they lack variety; they provide but few rest periods and even these are limited in extent. In order to make books appear more attractive, illustrations were introduced, not so much for their value in aiding the pupil to understand the textual material more readily, but largely in order to make the page appear less discouraging. Probably all publishers of an earlier day would have been quick to deny this indictment and perhaps, too, they might have been able to point out examples of instances in which the illustrations were really helpful. But in general there was no established policy of illustrating for meaning's sake. This was more characteristic of sketches and photographic reproductions than of figures and maps. Probably, in the last analysis, the teachers instead of the publishers were to blame. If teachers had used illustrations and consequently demanded useful ones, these undoubtedly would have been provided.

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[1] See p. 66 for a discussion of labeling.

At the present time textbook illustrating represents a large area in the publishing field, one in which a great deal of time, effort, and money is invested. Highly specialized and trained expert services have been developed in order to collect, make, prepare, place, and use pictorial representations to their best advantage. No longer are illustrations hurriedly collected, undiscriminatingly selected, and carelessly dumped in for ornamental purposes.[1] Potential illustrations and the methods of presenting them are studied and experimented with on the basis of modern physiological and psychological knowledge and as a result our textbooks are being continuously improved. Illustrations are being used more liberally than ever before and they are more functional because they are deliberately designed to interpret, enrich, and supplement the text. In fact, the illustrations of a good modern textbook are integral parts of it. In a similar manner the descriptive legend, which replaced the earlier word—one-word, or few-word—label, is also being continuously studied and improved. Textbook illustrations, like any other pictorial representations, should be studied, analyzed, thought about, correlated, and applied, but, sad to relate, often this is not done.

Although the second trend in textbook illustration development is, in one way, but an extension of the first, basically it is quite different. In the first trend the text is still the starting point and the illustration supplies the enrichment; in the second, the illustration is the starting point and the text amplifies it. In this case the text is largely a glorified descriptive or explanatory legend. Probably this technique is psychologically sound too, at least this is the order of actual learning —first a percept or visual experience and then a concept or mental image. Examples of this type of presentation are the books widely used in the training provided by large industrial concerns, the hundreds of children's picture books that are to be found in any bookstore, and the textbooks that are being increasingly used in the primary grades of the schools.

The best known of this type of book for older boys and girls is "Building America" which was published first in 1935. This "book" is really not a book at all but an annual series of eight monthly magazines, each one of which concerns "an important aspect of American Life." Illustrative of these aspects are Food, Health, Communication, Clothing, Conservation, Movies, Social Security, and We Consumers.

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[1] Incidentally, the 105 illustrations of this book were selected from more than 300 that were seriously considered.

Each issue contains intriguing photographs, maps, graphs, and other pictured materials of a very high technical and instructional quality. The "Teacher's Guide" contains many very practical correlated helps —directions, suggestions, questions, topics, references, and activities.[1]

Another excellent illustration of this method of presentation is the "Picture Fact Books" prepared by Picture Fact Associates and published by Harper & Brothers. Five of these very attractive books, designed for vocational-guidance purposes, have been published: "Air Workers," "Movie Workers," "News Workers," "Nurses at Work," and "Textile Workers." These books run about fifty or sixty pages and are a little larger in dimensions than the usual school textbook. Each contains various types of illustrative charts and graphs as well as large and small photographs.

A third illustration of this type of book is "Picture Scripts" edited and developed by staff members of Lincoln School, Teachers College, New York City.[2] These attractively covered and fully illustrated little books provide easy reading material for early elementary grades on subjects of interest to children in the everyday world of their own environment and "in the far distant land of their dreams." Illustrative of the topics covered are: social studies, "Trains of Long Ago" (transportation) and "The Coast Guard" (safety); science, "Experiment Book"; and arts, "How To Make Toys."

Probably the most striking illustration of the textbook use of the visual idea is "Excursion in Mathematics," by Ernst R. Breslich.[3] This book contains, in addition to more than fifty very fine illustrative marginal drawings, twenty-one large pictures designed for stereoscopic use. The right-eye view is printed in blue, and the left-eye view is printed in red upon the first in exact register. When the Orthoscope—simple cardboard spectacles with red and blue lenses, carried in an inside cover pocket of the book—is held before the eyes, the red-blue picture appears in normal color and in startling three dimensions. Naturally, this device makes for true percepts of solids, geometric volumes, conic sections, etc. Below each of these illustrations is a simple geometric line form of the object or theme with a brief summary in text beside it.

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[1] An interesting and detailed description by the editor, James E. Mendenhall, of how text material and pictures are collected and selected for inclusion in these study units will be found in Problems in Preparing Pictorial Material for Classroom Use, *Educational Screen*, vol. 17, pp. 119–120, April, 1938.

[2] These books, price 10 cts. each, are published by E. M. Hale and Company, Milwaukee, Wis. More than thirty of these books have been issued and others are in preparation.

[3] Published by the Orthovis Company, Chicago, Ill., 1938.

These books are novel, no doubt, and for that reason are intriguing. And attraction is the starting point of any deep-seated interest. The present trend toward utilizing textbook illustrations, together with the success of these newer types of material, presages a most profound and beneficial change in American textbook production.

SELECTING PICTURES

If pictures are to be used most effectively they must be selected most carefully. A miscellaneous collection of odds and ends does not represent a good and useful file of material. The following questions will suggest some of the more important technical and instructional standards or criteria on the basis of which a picture should be judged.[1]

1. Is it purposeful? Relevant? Significant? Does it show clearly the points desired? Will it really aid? Specifically, just how?
2. Is it truthful? Accurate? Authentic? Up to date? Complete?
3. Is it easily understood? Simple in composition? Proper in emphasis?
4. Is it stimulative? Interesting? Will the pupils study it seriously?
5. Is it suggestive of reality? Action? Contrast? Comparison? Continuity?
6. Is it appropriate to the age and grade levels of the pupils?
7. Is it artistic in elements, composition, lines, color, and finish?
8. Is it a good print? Clear and distinct? Free from blemishes or soiling?
9. Is it of practical size? Large enough to show details, and small enough to be easily handled and used?

PRESERVING AND FILING MATERIALS

In order to preserve pictorial materials and also to insure that they are easily available when wanted, a filing system is necessary.[2] In the classroom or small school this need not be elaborate, but it should be practical and well arranged. Usually for mounted prints an upright filing cabinet (see Fig. 35) of cap or legal size, which may be bought new or secondhand, or made, is quite satisfactory. Shelves and boxes may be used for more cumbersome types of material.

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[1] An analysis of several sets of criteria for judging pictures will be found in the article referred to in the footnote on p. 103.

Probably the most thoroughgoing scientific study of standards for pictures is Lelia Trolinger's dissertation, "Evaluation of Still Pictures for Instructional Use," published by Educational Screen, Inc., Chicago, 1939. A condensation of it will be found in *Educational Screen* for March, April, and May, 1939. This investigation included the development of a score card (the various criteria of which are discussed in detail) and an experimental testing of the value of it. Too, a good review of pertinent literature is included. This study can be read with profit by any teacher interested in visual aids.

[2] A pertinent article is N. Riley, A Picture Library and Its Use, *Journal of Geography*, vol. 37, pp. 202–205, May, 1938.

All material should be classified and catalogued or indexed in order to make it easily accessible. A cataloguing system is composed of two main parts, a numbered or lettered descriptive statement on a card or list that corresponds to the number or letter of the item in the file. Both major and minor classifications are desirable. The Dewey decimal system is quite useful for the larger and more complete files. If several teachers or groups use the material a cross-indexing system, which lists individual items as well as complete sets under several heads, will be necessary.

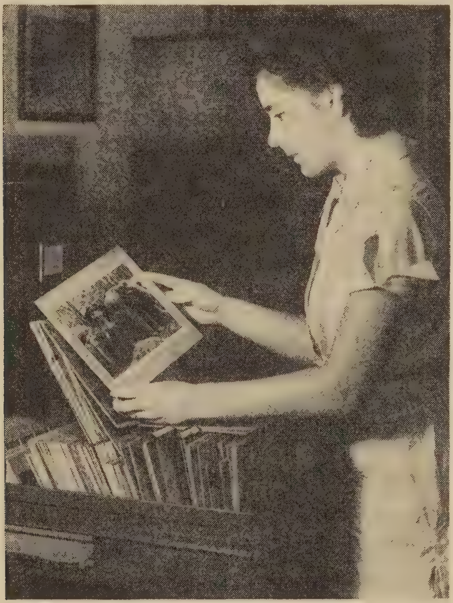

Fig. 35.—Keeping mounted pictures in a catalogued file protects them and insures that they are readily accessible. (*Courtesy of Educational Screen.*)

Transparencies, slides, and still film are usually somewhat fragile and easily damaged and should be suitably protected against scratching, breakage, soiling, or other injury. They may be wrapped up, framed, or placed in suitable jackets or envelopes, labeled, and then properly filed in a box or other container.[1]

Although such filing may not always be so convenient for classroom purposes or allow for replacements so easily as the folder file, scrapbook or album filing is an economical method of preserving materials. The books may be either made or purchased. Sometimes it is possible to obtain, from a local clothier or tailor, sample catalogues which may be used advantageously. These can be adapted by tearing out the samples and covering the advertising matter, or even the entire page, with art paper. An album may be made for a particular subject or even for particular units of a subject. Often these albums may be made the basis of a display or an exhibit. Also, pupils may be encouraged to produce their own picture books, being motivated by a contest or an exhibit. Album making offers a very real opportunity for a practical training in art.

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[1] See pp. 139–140 for a more detailed discussion of filing this type of material.

Maintaining and improving a file is a continuous process because of the possibility, and probability, unless very closely supervised, of material becoming misplaced or lost, and also because the material must be kept up to date. Newer and better illustrations will frequently be found and these should be added or used to replace inferior items. Therefore provision should be made for future development of the file. A conveniently located work table will be found of great value in the handling and filing of mounted materials.

TEACHING WITH FLAT PICTURES

Selecting a good picture and preparing it for classwork are worthless gestures unless the picture is utilized effectively. And it can never be utilized effectively until the teacher knows its elements and recognizes and appreciates its potentialities and applications and acts accordingly. Merely allowing the pupils to look at pictures rarely, if ever, represents effective utilization. They must be led to look for and to see things and relationships. Even at best a picture is not only a complicated thing, but also only a partial substitute for reality. Its representations can never be considered completely self-explanatory or its lessons completely self-evident. Although some of the ideas reflected may be clear, certainly some of them, such as distance, speed, action, height, weight, breadth, temperature, sound, taste, odor, tactility, and color are at least somewhat abstract, and often very considerably so. A picture leaves much to the imagination. In short, it must be very definitely and intelligently "taught" if it is to be correctly interpreted, understood, and correlated by the pupil.

The understanding of an abstraction depends on previous experience by which or through which an item is interpreted. If the pupil does not have this experience his conceptions are quite likely to be erroneous. Naturally, then, a picture is abstract in those elements with which the pupil is not familiar. The pupil who has listened to the roar of an aviation motor, felt the heat of a blast furnace, or smelled the odors of a gas plant can easily read these experiences into the appropriate elements in pictures and get a full meaning from them. The pupil who has never had these experiences visualizes incompletely.

Quite frequently the picture itself contains hints that help the pupil to interpret it properly or help to make it real. The heavy furry clothing worn by the Eskimo clearly suggests a low temperature, while the scanty clothing worn by a Fiji Islander suggests high temperature; the foamy wake behind a speedboat indicates both direction and speed; and the picture of a man alongside an animal or a building indicates size. A good legend provides descriptive or explanatory notes that help the pupil to translate vague abstractions into vivid realities. Teaching the pupil to look for these comparative and explanatory items is one method of relating experience and so reducing the number and the degree of abstractions. Making comparisons and explanations with pupil-experienced items outside of the picture is another.

FIG. 36.—Scenic postcards represent a common and highly instructive type of flat picture. Here, Genevieve Steuterville of Nebraska City Senior High School stands beside a part of her collection of nearly six hundred picture postcards.

Occasionally pictures without legends or captions can be used to good advantage by the teacher. For instance, such pictures may be used to stimulate the pupils to think about a new unit or topic. They can be used in a number of identification games, review stunts, and in tests. Further, displaying uncaptioned pictures and having the pupils suggest appropriate titles, captions, or legends represent a good method of teaching the pupils to look at pictures intelligently. In such instances the pupils must actually "look for something;" they must see all of a picture's various elements and evaluate these in terms of relative importance or relationship. What else is "looking at pictures intelligently?" A comparison of the pupils' captions with the "official" legend (written on the back of the picture, or on a corresponding card) will serve as an immediate and therefore functional checkup or test.

Many a teacher attempts to use a picture too hurriedly, jumping right into it and expecting the pupils to follow. In so doing she evidences an ignorance of what actually takes place when a person looks at a picture. The person who looks at a new picture looks at it at least twice, or in two different ways. First, he glances over all of it in order to get a more or less superficial overview or general survey. In doing this he learns its general theme and consequently what it is about—horses, war, sports, buildings, nature, or other topic.

This gives him the setting and the proper mind-set which will help him to interpret many of the other elements of the picture which he could not do so easily if he saw only a small portion of it. It would be possible, for instance, for a small portion of a picture (with the remainder of it covered) to be mistaken for a part of a horse, a building, a rock, a tree, or almost anything else. Second, he looks it over again and then centers his attention on the unabstract elements, the parts, sections, or aspects that interest him because of his previous experience. It is true that occasionally the very unusual or the very beautiful or some other striking element or characteristic of the picture will catch this second look, but generally this look centers on items in which the viewer is interested, has some knowledge about, or has had some experience with.

It is entirely possible and often quite probable that the items the pupils sees in his second and later looks do not represent the items which the teacher wants him to see, or at least wants him to see most—the things that represent her purpose in showing the picture. But she must allow ample time (especially in the typical class in which some pupils will look more slowly and see less than others) for these first two looks, because he is going to take them whether she has other plans or not, and if he takes them first she will be less handicapped by conflicting interests when she points out her items. Further, such looks intrigue the pupil because they represent actual participation and self-activity. When the pupil's initial curiosity has been satisfied, at least partially, it will be comparatively easy for the teacher to indicate, either directly through pointing out, or indirectly through questioning, the elements or relationships she has in mind. Usually too, what the pupil has already seen in the picture represents experience that will help him to interpret more readily and easily what the teacher points out or emphasizes.[1]

Teaching with pictures will be successful only if the pupil has a good opportunity to study them at close range, and generally this means a supply large enough so that every pupil may have an individual copy. Occasionally it may be necessary and even desirable for a small group of two or three pupils to use a single picture at the same time, but generally speaking, such study is likely to be quite distracting, especially for the more timid pupils and those whose eyesight is weak. If a set of different pictures is being used, a "picture route" may be arranged in the class thus allowing each pupil to see all of the prints. At a given signal the prints are passed along to the next viewer. If the pictures are hung around the room the pupils and not the prints change places. If at all necessary and possible, and often it is not, the teacher should so arrange these prints that the pupil receives them in some logical or progressive order.

Because a picture is a complex thing, the pupil should be allowed plenty of time in which to master it. Learning the picture should not be handicapped by hustle and hurry which bring unthinking, erratic, and careless responses, and often an unprepared and untimely anticipation for the next print. This means that not too many pictures should be shown at any particular time; and here is a common weakness in the work of teachers untrained or inexperienced in visual instruction—they attempt to teach too much. The test of good picture teaching is not to be found in the number of prints displayed but in the extent to which those that are shown are really learned. Studying a few carefully selected pertinent pictures is much more valuable than merely looking at a greater number.

In general, larger pictures, photomurals, photostats, or better still, projections should be used for group work. More than once the writer has seen pupils squinting, shading their eyes, leaning over sideways, standing in the aisles, and half standing in their seats in attempting to see a small picture that stood in the blackboard trough or on the teacher's desk, or hung at the front of the room. Such use of pictorial materials is inexcusable. Incidentally, pictures hung about the room should be hung attractively, that is, low enough for the pupils to see them without standing on their tiptoes or stooping, and away from bulletin board and other similar more or less untidy material; too, they should usually be framed. Many schools use frames with removable backs so that the pictures may be easily replaced with new ones.

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[1] Two good references by G. T. Buswell on this topic are "How People Look at Pictures," University of Chicago Press, Chicago, 1935; and Learning to Look at Pictures, *Progressive Education*, vol. 14, p. 422, October, 1936.

Other commonly approved and used teaching techniques, such as, making a good assignment, giving definite directions, asking pointed and useful questions, making clear and practical applications, illustrating or supplementing with other aids, and stimulating, respecting, and fairly evaluating pupil answers, questions, comments, and discussion, and testing, are as logical, necessary, and helpful in teaching with pictures as they are in teaching with any other instructional devices and materials.

THE STEREOGRAPH

The stereograph, unlike the motion-picture film or the glass slide, was not used first by the industrialists or by college professors and then brought into the elementary and high schools—it was first used in the home, where it was introduced about the middle of the nineteenth century. Although all of us have probably marveled at the extremely realistic view which it presents, it is interesting to note that it has not been used so extensively in the schools as some of the other visual aids. Probably the main reason why it is not used more widely is that few teachers know how to capitalize it as a teaching aid. However, as teachers become better acquainted with its value and the methods of using it, this device will probably be one of the most popular visual aids in the still-picture group.

The Stereograph, the Stereoscope, and the Telebinocular.—The stereograph is prepared by using two cameras or a camera with two lenses which photographs an object from two different angles. The resulting pictures are mounted side by side on a cardboard. When viewed without the stereoscope the scenes look exactly alike. When placed in the stereoscope both pictures merge into one scene, with not only height and width but depth as well. The stereograph is very inexpensive; some are available at an approximate price of 20 cts. each.

The stereoscope is an instrument with which most teachers are familiar. When in position against the face the hood shuts off all light from the sides. The stereograph is placed in a frame which is moved forward or backward to bring the view into correct focus. Naturally, the viewer should sit with his back to the window so the light will fall directly on the stereograph. This, of course, is not necessary in case the instrument is equipped with an electric light and reflector. A good stereoscope can be purchased for from $1 to $3.

The telebinocular is a binocular or field glass mounted on a table, tripod, or pedestal and generally equipped with a bulb for lighting the stereograph. Naturally, the better lenses and the brilliant light from the hooded bulb bring out the details of a picture more clearly than the stereoscope. The telebinocular sells for from $6 to $12.

Advantages and Limitations.—The outstanding advantage of the stereograph is that it presents a more realistic view than is presented in any other type of flat picture. This realism is due to the fact that the view is seen in three dimensions, whereas the photograph or print is seen only in two. It has no depth. Because of the third-dimension illusion the stereograph seemingly becomes the environment of the child. He is for the time being projected into the scene before him, the elements seemingly surrounding him. In viewing the flat picture depth is gained through perspective, but the size and shape of objects are not nearly so clear and distinct as they are when shown in the stereographic view.

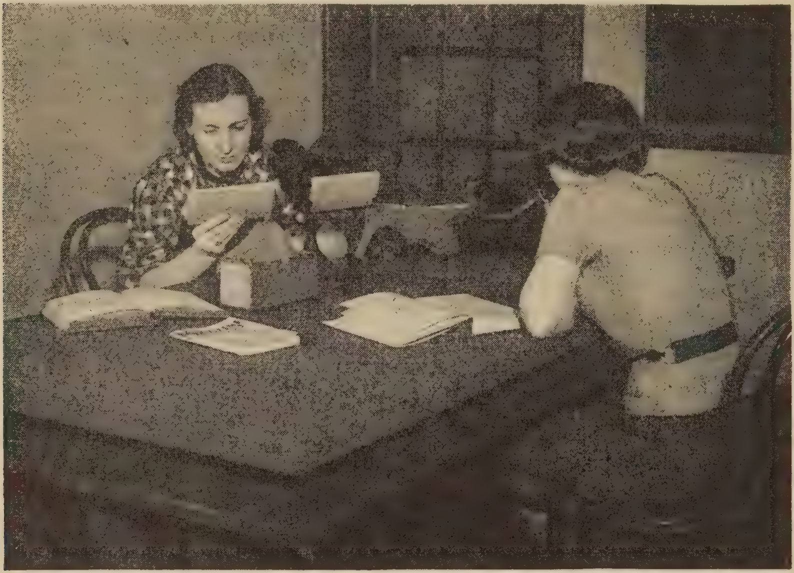

FIG. 37.—The stereograph is the most realistic of all pictures because of its illusion of depth. (*Courtesy of Keystone View Company.*)

The chief limitation of the stereograph is that it is designed for individual instruction only; it is rarely or never used for group instruction.[1] In some very few cases, children with defective vision will not be able to see the third dimension; fortunately, however, these cases are very rare.

Teaching with the Stereograph.—The stereograph is best suited to individual instruction, and consequently it is a good plan to have the students use it during the study period. Because of the many details brought out by the third dimension, the student will find that it requires more time for mastery than a photograph or print. Hence, only a very few views should be used at any one time. Often, especially with new work, it will be possible to use only three or five views in the allotted time. Four or five pertinent questions on each view will help the child to study it more carefully. If several views are available for one unit of work, all may be used by the student for a rapid preview or review. However, if lantern or film slides are available on the same unit, they may be used to good advantage in reviewing the unit with the class. Carefully prepared plans for the use of stereographs are at least as important as for the use of other types of flat pictures, probably more so.[2] As is the case with all visual aids, the stereograph should be available to the student. Consequently, whether kept in the visual department, the library, or the classroom, the stereograph should be just as accessible to the child as any other reference material.

The standards listed in this chapter for the selection of flat pictures and the suggestions made for the storage of this material apply equally well to the selection and storage of stereographs.

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[1] The Keystone View Company, the outstanding producer of stereographs, discontinued recommending the using of these pictures as a class activity many years ago.

[2] An excellent discussion and a type lesson on the stereograph as an aid in teaching solid geometry will be found in C. F. Hoban, C. F. Hoban, Jr., and S. B. Zisman, "Visualizing the Curriculum," pp. 152–153.

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CHAPTER VII

PROJECTED STILL PICTURES

Until the invention of the still-picture projector, the so-called "magic lantern," in the seventeenth century, a picture could be viewed by only a few people at a time; but by means of this projector a picture, thrown on a screen or wall, may be seen by large groups of people. This, then, is the outstanding advantage of the projected picture.

The values of the flat "still" picture as a teaching aid have been set forth in Chap. VI. When the picture is projected on the screen these values are enhanced, because through projection the picture is enlarged so that it may be studied in every detail by each member of the class. Hence, the projector makes the picture a suitable aid for group instruction.

PROJECTORS

There are several kinds of still-picture projectors now on the market each of which has certain advantages or limitations that should be considered before a purchase is made. These advantages and limitations will be pointed out as each type of projector is discussed. The most widely used still-picture projectors are the standard lantern slide, the 35-mm. strip film, the 2″ × 2″ lantern slide, and the opaque projector.

The first three projectors mentioned are so designed that, in making the picture on the screen, the light passes through the image. In the opaque projector the light is reflected from the picture through a series of mirrors. Each type calls for a different type of projection material.

The Standard Lantern-slide Projector.—The so-called standard lantern-slide projector is probably the oldest type, having been used over a long period of years, and it is one with which most teachers are familiar. The material to be projected is reproduced on a glass slide 3¼″ × 4″. The word "standard" is now applied to this size to distinguish it from the newcomer in the field, the 2″ × 2″ glass slide.

One of the chief advantages of this projector is to be found in the large area through which the light passes. This means more light on the screen and, consequently, a more brilliant picture. Further, sufficient light is provided so that the machine may be used in a semi-darkened room and this means light enough so that the students can take notes while the picture is being screened.

Another advantage of the lantern-slide projector is that it is easy to move from room to room; it requires only access to current. Most of these projectors now have adjustable bases so that they may be placed on a desk or table of almost any kind. The simplicity of setting up and the ease of operation are two factors that have made this projector the choice of hundreds of teachers for classroom use.

The main disadvantages of this type of projector are: (1) the slides are made of glass and are breakable;[1] (2) slides are large and require considerable space for storage; (3) glass slides are heavy and if the school plans to rent slides, transportation costs may sometimes exceed rental on the slides; (4) if the school plans to buy slides and build its own library, the cost of the slides is often prohibitive, the prices ranging from 40 cts. to $1.50.[2]

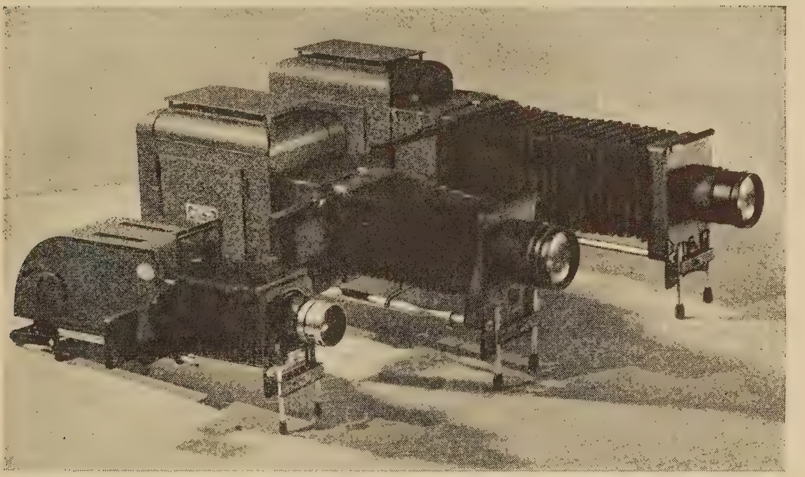

Fig. 38.—Typical lantern-slide projectors—two "standard" and one 2″ × 2″. (*Courtesy of Spencer Lens Company.*)

Attachments for the Lantern-slide Projector.—There are five devices that may be used advantageously on the slide projector—the 35-mm. strip-film attachment, the micro-attachment, the Flash-

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[1] A 75-mm. film strip called "Stillfilm" is now available on the commercial market. It requires a simple holder.

[2] If a visual department has its own photographic laboratory, this expense, including overhead, does not exceed 11 cts. per slide.

Meter, the automatic slide changer, and the Stillfilm attachment for 75-mm. film strip. The strip-film attachment, which costs $38.50, makes it possible to project the 35-mm. strip film. As the name suggests, the micro-attachment is used for projecting microscopic slides on the screen. This micro-attachment costs approximately $20. Incidentally, one should not buy too many attachments for a single machine because this can be used in only one room at a time, and further these attachments may cost more than a straight projector for the 35-mm. strip film.

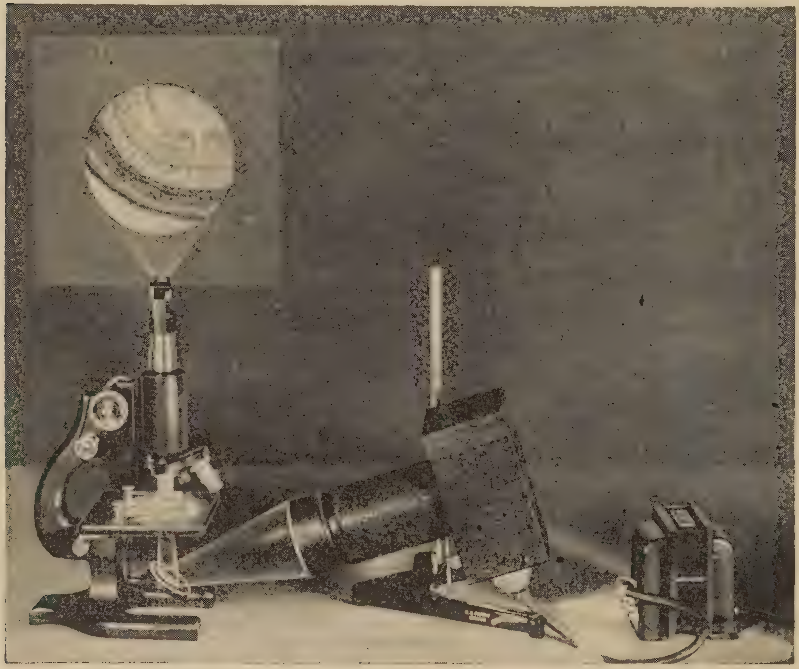

FIG. 39.—By means of this device the item under the microscope can be projected onto a screen. (*Courtesy of Central Scientific Company.*)

The Flash-Meter, a new attachment that has recently been placed on the market, is a device very similar to a camera shutter. It is clamped over the end of the lens barrel. Like the camera shutter the Flash-Meter may be set to allow a picture, a word, a series of words, or a paragraph to remain on the screen for intervals of time ranging from a fractional part of a second to long periods. This instrument was designed to be used in teaching reading and simple arithmetic. Regarding it the inventor states:

The Flash-Meter was devised as an aid in instructional, diagnostic, and remedial work in reading. It can be used from the first grade to the university, inclusive.

The chief purpose of the inventor was to devise an instrument that would help to increase the recognition span, shorten fixation pauses, reduce the percentage of fixation pauses, help to eliminate regressions, develop good habits of concentration, and reduce lip reading in the lower grades.[1]

To illustrate this use: if the phrase "in the morning" is flashed on the screen for one-fifth of a second, the child must read the whole phrase at a glance and not read it one word at a time. In controlled experiments excellent results have been obtained in the lower grades and equally satisfying results have been obtained in remedial work. The price of the complete Flash-Meter outfit is $66.50.[2]

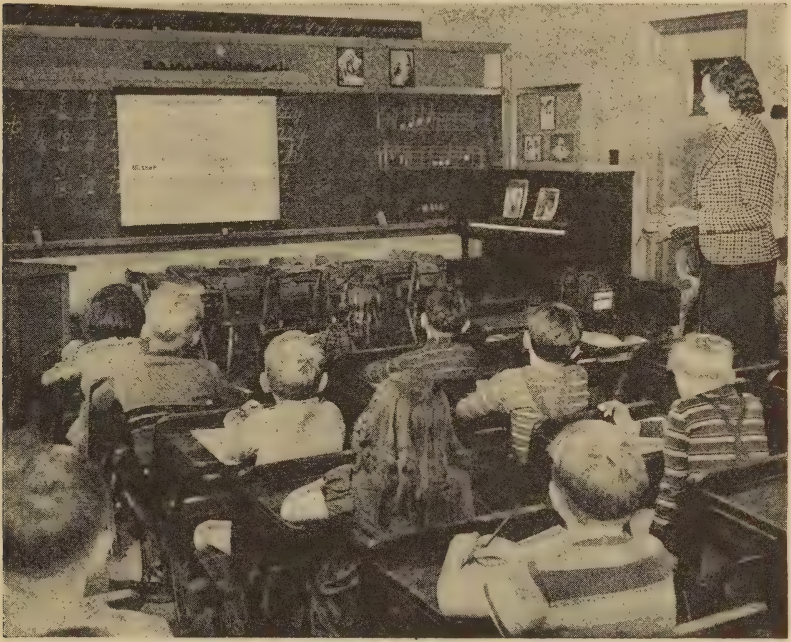

FIG. 40.—Using the Flash-Meter in the classroom. This device is the modern counterpart of the formerly used "flashcards." (*Courtesy of Keystone View Company.*)

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[1] The Flash-Meter is distributed by the Keystone View Company, Meadville, Pa.

[2] Those who are interested in teaching reading will find the following booklet helpful: R. P. Carroll, "Reading Preparedness Tests and Exercises," Keystone View Company, Meadville, Pa., 1939.

The "Selectroslide" (see Fig. 41) is a mechanical slide changer that may be operated by set automatic control for continuous action, or by remote push-button control from any part of the room. It is an electrically driven mechanism contained in a drum-shaped housing. The interchangeable magazine holds forty-eight slides in numbered slots arranged radially. The unit, which is attached to the projector

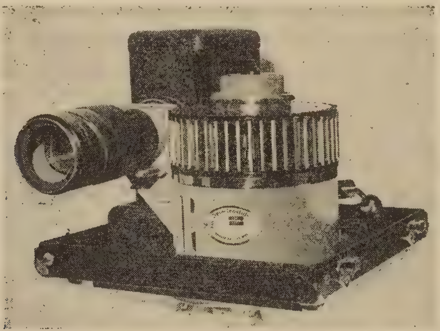

Fig. 41.—The "Selectroslide" automatic slide changer and projector. Note that this compact unit is attached to the bottom of the carrying case. (*Courtesy of Spindler & Sauppe, Inc.*)

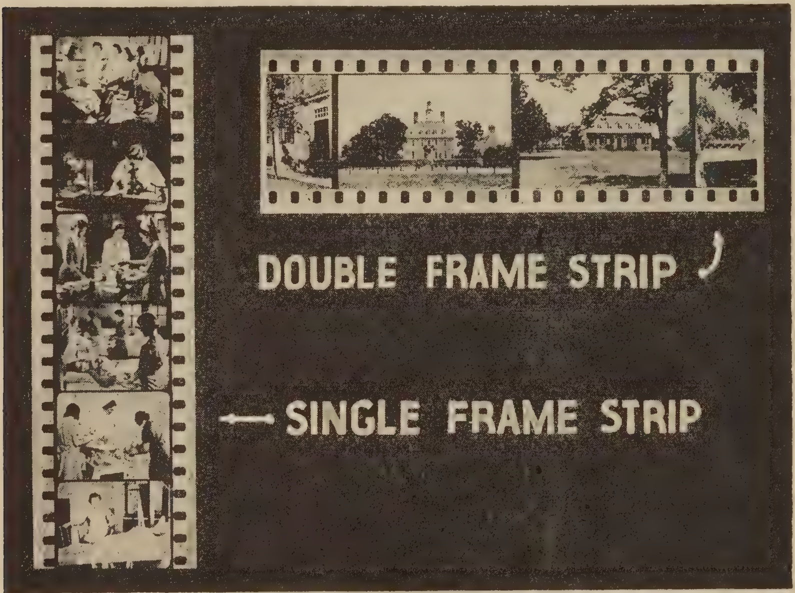

Fig. 42.—A properly equipped projector can handle both the single and the double frame film strip. (*Courtesy of Society for Visual Education, Inc.*)

by means of a bracket, measures about 8 in. in diameter, stands 9 in. high, and weighs about 13 lb. The company recently announced "Selectroslide Jr.," an inexpensive 16-slide model operated by automatic control.[1]

The 35-mm. Strip-film Projector.—As the name suggests, this machine is made to project pictures printed on a strip of film instead of on a glass slide. The strips range from 10 or 12 in. in length to as much as 3 or 4 ft. The number of pictures per strip varies from ten to more than a hundred, the usual number being between forty and fifty.

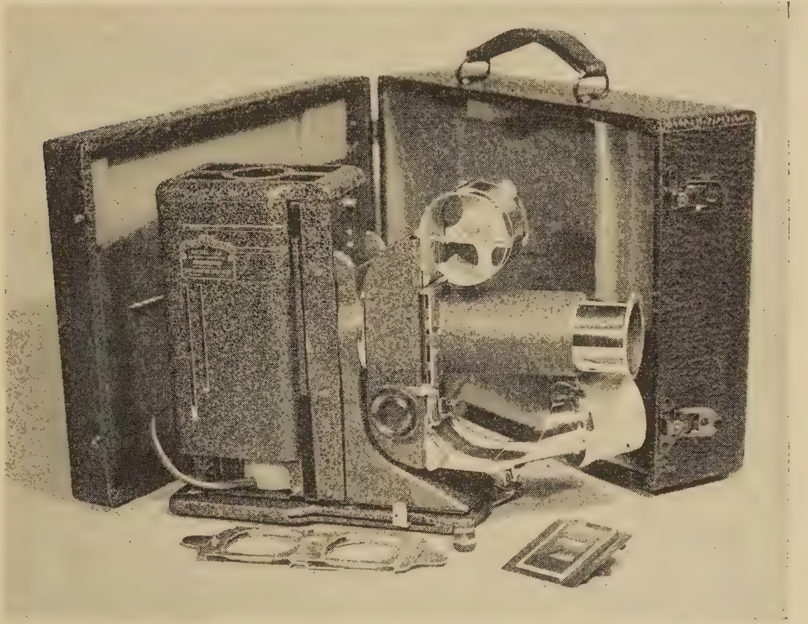

FIG. 43.—This tri-purpose projector can handle single and double frame film strips, and 2″ × 2″ glass slides. (*Courtesy of Society for Visual Education, Inc.*)

Each picture on the strip film is referred to as a frame. The single frame measures ¾″ × 1″. Recently, "double frame" projectors, in which each picture on the strip film is twice the area of the single frame, or 1½″ × 1″, have been produced. Nearly all the new projectors are equipped to project either the single or double frame picture. The "Tri-Purpose" projector (see illustration above also accommodates 2″ × 2″ slides.

The outstanding advantages of the 35-mm. strip-film projector are: (1) the machine is very light and may be easily moved from room to room; (2) the film strips are light; (3) the film strips require very little space for storage; (4) the projector is inexpensive, the cost ranging from $12 to $60; (5) the film strips are inexpensive—from 1 to 5 cts. per frame in black and white, and from 10 to 25 cts. per frame in color; and (6) film strips are easily obtainable.

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[1] These devices are distributed by Spindler & Sauppe, Inc. (see p. 372).

The two disadvantages of the strip-film projector are (1) only relatively little light reaches the screen and consequently the room must be darkened more than is necessary when the lantern-slide projector is used; and (2) the pictures on the strip film are in a series and hence are not so flexible for use as are slides.

In general, if the school is planning to build up a library of films, the strip-film projector represents an ideal purchase. A wide variety of these films may be rented from commercial companies, but it is usually more economical in the long run to purchase them outright (or have them printed locally) because the rental plus the postage may amount to as much as one-third of the cost of the strips.

The 2″ × 2″ Projector.—This projector is designed to handle the 2″ × 2″ glass slide and nearly all models of it are equipped to handle the 35-mm. strip film, either single or double frame as well. Most of the 2″ × 2″ slides are made by inserting one picture (double frame) from the 35-mm. strip film between two plain glasses. A strip film is easily scratched and ruined; this is true especially of color film. However, by this method of mounting film pictures the slides may be used over and over again without danger of damage. The cost per slide, for mounting pictures of this type, varies from 10 to 40 cts., depending upon the type of film and the type of mounting used.

These projectors are equipped with 100-, 200-, 300-, 500-, or 750-watt bulbs and, like the strip-film projector, give better results in a well-darkened room. However, the use of high wattage bulbs gives fairly satisfactory results in a semidarkened room.

An outstanding advantage of the 35 mm. and the 2″ × 2″ slide projector is the ease with which one may photograph subjects of his own choosing and thus prepare a permanent library of strip film or 2″ × 2″ slides. Cameras using the 35-mm. film cost from $10 up to $500 or more. However, one may secure excellent pictures with equipment costing less than $50.[1] If color pictures are desired it is almost necessary to use a light meter. This meter gives the nearest exposure needed for the best results, not only with color film, but with black and white as well. Light meters range in price from $6.50 to $22.50.

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[1] See p. 372 for a list of camera companies.

The Opaque Projector.—This type of projector reflects light from a picture, a coin, or other object or material, by a series of mirrors through the lens onto the screen. Because the image is reflected, a very dark room is required for best results.

The chief advantage of this machine is to be found in the wealth of material that may be used in it. Pictures from magazines, textbooks, post cards, encyclopedias, and numerous other sources may be used. It is not even necessary to remove the picture from the book in order to project it. Although most of the earlier machines of this type were unsatisfactory, because the heat from the lamp destroyed the pictures, the newer projectors are equipped with cooling systems which completely overcome this defect. This point should be considered if the purchase of a used machine is being contemplated.

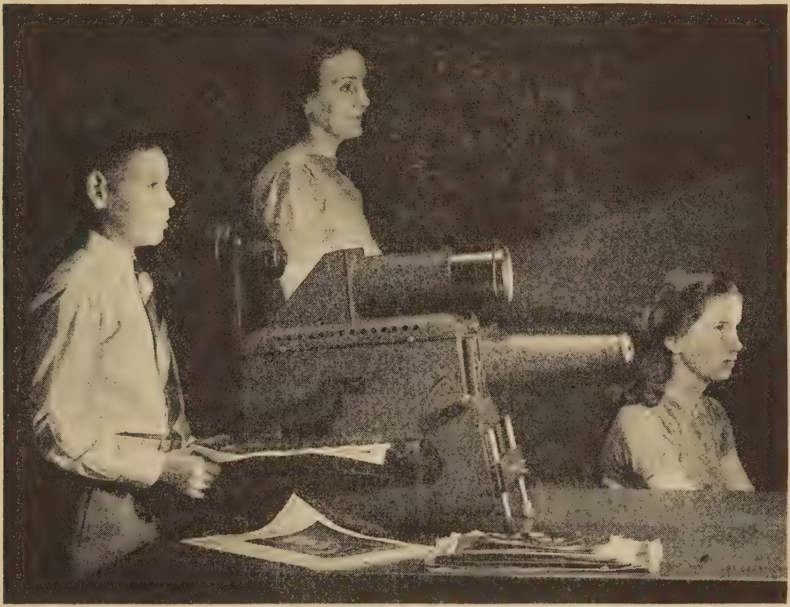

Fig. 44.—The opaque projector, which reproduces flat materials by reflection. (*Courtesy of Spencer Lens Company.*)

In addition to requiring a dark room, the opaque projector is large, and therefore not so easily transported as are the other machines which were discussed.

Nearly all opaque projectors are equipped to handle standard slides as well as opaque material, and, of course, all "combination" projectors are so equipped. If desired, an attachment for handling the 35-mm.

strip film may also be secured. The price of opaque projectors suitable for classroom use ranges from $75 to $180, depending on the attachments selected.

SELECTING A PROJECTOR

A projector should be carefully and intelligently selected, not only because its direct cost and its indirect cost in materials used, repairs and replacements, represent a considerable investment, but also because the educational results to be obtained from its use are highly important. Further, an inefficient, or, for that matter, inefficiently handled, projector will handicap the healthy development of this phase of visual instruction. A brief discussion of some of the main items to be considered should be beneficial to those who are contemplating purchases.[1]

Use.—Such questions as the following are pertinent in this connection. Specifically, just how will the projector be utilized in classroom work? For what ages of students? In general, for what sizes of groups? In what subjects? How frequently? Is it possible that more than one teacher will want to use it at the same time? Is current readily available? Will it likely be used in one room only, or in several rooms? Can it be easily, successfully, and safely operated by older pupils? For what types of material?

Type.—Under certain conditions the slide or the film-strip projector might be the most desirable, and under others the opaque projector might be more useful than these. The answers to the above questions, particularly those relating to material, will help to make an intelligent choice of type of machine.

Room.—The room or rooms in which the machine is to be used must be considered. If the projector will be some distance from the screen, an objective lens of a longer focal length will be required than if it is close to the screen. To determine the correct focal length of the lens one should submit to the companies whose projectors are being considered the size of the picture wanted on the screen and a report of the distance between the proposed placements of screen and projector. It is a common mistake of many teachers and administrators to select dimensions of a picture for classroom use that are much larger than actually needed. Unless the classroom is unusually large, an image 36″ × 48″, or 48″ × 54″ at the most, will be adequate.

If the projector is to be used in a large auditorium in addition to the classrooms, it may be necessary to buy a lens of unusually long focal length for this purpose.

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[1] See also pp. 171–172.

General Specifications.—The 500-watt lamp is used in all standard lantern-slide projectors and any one of the three or four leading makes should give satisfactory service. For the smaller projectors the 100-, 200-, or 300-watt lamp may be used. A heat filter is desirable with bulbs of more than 200 watts. These filters are standard equipment in nearly all the leading makes of small projectors. Naturally, the smaller the lamp the darker the room must be for suitable projection. The other essential parts of the projector are the reflector, the condensors, and the objective lens. The better the quality of these parts the more expensive will be the machine.

Cost.—The selection of a projector will depend, to some extent at least, upon the money available for it. In general, especially for a beginner, it is probably better to buy a new machine than a used one. And, obviously, although price is not always necessarily a good index of quality, it is reasonable to assume that the higher priced machines are made of better material and so will give better service than the lower priced devices. Too, as suggested at the beginning of this section, the matters of attachments, repairs and replacements, as well as the cost of materials, either bought or rented, should be considered. Needless to state, the reputation and reliability of the firm should be investigated. A guarantee from some small, fly-by-night company that sells projectors as a side line will not be so safe as that from a larger, more firmly established company that specializes in projector production. Further, needed attachments, replacements, and repairs are more readily obtained from the larger more reputable concerns. Important, too, is availability to factory service and repair departments.

Demonstration.—Before making a final decision it is well to try out or have a demonstration of all machines that are being considered, preferably at the same time and on the same screen, so that the conditions will be identical. A careful investigation of the experience of other schools with the various machines should be made in order to check both sales talk and demonstration.

OPERATION AND CARE OF PROJECTORS

Machines of this type require very little skill for successful operation. Almost all of them are equipped with heat filters, and hence there is little danger of damage to the slides or film strips. In order to operate these projectors, one needs to know how to put the material in the machine, and how to focus it. In some cases it might be well to know how to change a bulb. However, all these steps may be mastered in a few minutes by studying the instructions accompanying each machine.

Whenever possible, student operators should be appointed to take care of the projector. This frees the teacher and allows her to be near the screen, or about the classroom where her help is most needed.

Slides are made of glass and, therefore, may be broken if dropped or carelessly handled. When slides are being used, they should be placed in a tray that has a rim at least 2 in. high, so as to prevent them from being accidentally pushed off onto the floor. Trays or slide boxes should always be placed on a substantial desk or table.

Because they contain very few moving parts, still projectors require little if any special care. They should be stored, well protected from dust, at a centrally located and easily accessible place. The reflector, condenser, and lens should be cleaned frequently with a soft paper or special lens tissue. This should be done by the director of the visual-aid program, or by a competent person appointed by him. It is well to keep a supply of extra bulbs for each machine handy at all times.

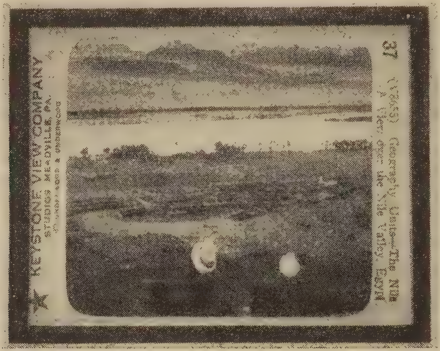

Fig. 45.—A standard photographic lantern slide. (*Courtesy of Keystone View Company.*)

SLIDES

Photographic Slides.—The photographic is the type of lantern slide used most frequently by lecturers and teachers. This slide is prepared from the negative of a picture. The process is very similar to that followed in reproducing the negative on paper, except that a sensitized glass is used. After the image on the sensitized glass is "fixed" and dried, a mat or border of paper about ½ in. wide is run around the margins. A clear piece of glass, called a "cover glass," is placed on top of the mat, and the edges are bound with a regular binding tape.[1]

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[1] An excellent set of directions for making photographic slides will be found in E. C. Dent, "The Audio-visual Handbook," rev. ed., pp. 58–62, The Society for Visual Education, Chicago, 1939.

Photographic slides may be of either the traditional black-and-white print or colored. Naturally, color in many instances adds a great deal not only to the value of the picture, but to its attractiveness as well. Most of the colored slides on the market today are hand tinted. This is a process that requires both additional time and expense. Color film of the 3¼″ × 4″ size is even more expensive than the hand-tinted slides.

If the school has access to a darkroom, students and teacher will find the production of slides of this type very interesting. It is well to remember however, that the slide is a teaching aid and should be considered from the standpoint of use in the classroom, rather than as something to hold the attention of a few students who may be interested in producing it.

Handmade Slides.—This term is applied to all types of glass slides not included in the photographic classification. Handmade slides are of value as a teaching aid because: (1) they can be used to present material that cannot be presented in any other way; (2) they may be used by students to supplement a report, to summarize work, or to present graphically a series of facts; (3) the preparation of them serves to motivate student interest; (4) they are inexpensive; and (5) the best of them may be bound for permanent use and so help to develop a library.

The parts of a glass slide are: (1) the glass on which the image is drawn; (2) the cover glass used to prevent smearing the image; and (3) the binding tape. The mat mentioned in connection with the photographic slide is seldom used in the handmade type. However, a margin of about ½ in. should be left around the edge of the slide; the material in this area will not show on the screen.

There are several types of handmade slides, each of which serves a very definite purpose. The following brief directions will indicate how easily and simply these slides may be made.

Etched-glass Slides.—This type of slide is most commonly used to reproduce charts, outline maps, graphs, diagrams, and other material of a similar nature.[1]

The etched slide is simply a plain piece of glass roughened on one side with acid so that one can draw or write on it with pencil, colored pencils, or ink. The image or picture is traced or drawn on paper so that it will come within the 3¼″ × 4″ dimension of the slide. The glass, roughened surface up, is placed over the image to be reproduced, and the tracing is made. The slide is now ready for use. If it is to be used several times, a piece of cover glass bound at one edge with tape will protect the etched surface from finger marks and smears. If the slide is to be added to a permanent collection, the four edges should be carefully bound. If not made for a permanent collection the etched surface may be washed and the glass can then be used again.

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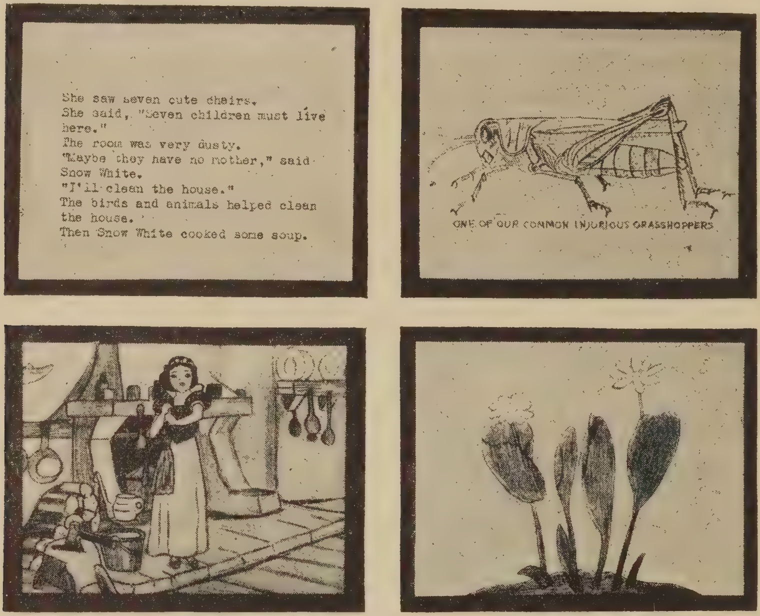
[1] A kit for making these slides may be obtained at prices ranging from $3.50 to $14.50. See list of sources on p. 372.

Extreme care should be used in preparing these slides, because the slightest error in tracing is magnified many times on the screen. A carelessly prepared or inaccurately traced slide loses much of its value as a teaching aid.



She saw seven cute chairs.
She said, "Seven children must live here."
The room was very dusty.
"Maybe they have no mother," said Snow White.
"I'll clean the house."
The birds and animals helped clean the house.
Then Snow White cooked some soup.

ONE OF OUR COMMON INJURIOUS GRASSHOPPERS

FIG. 46.—Four illustrations of handmade lantern slides. The textual slide was typewritten on cellophane; the grasshopper was drawn on etched glass with a lead pencil; "Snow White," with lantern slide crayons; and the flower, with slide crayons and inks.

The effectiveness and attractiveness of the slide may be improved through coloring, either with colored pencils or specially prepared ink. If the colored pencil is used, all strokes should be made parallel, and care should be exercised so that all shading or coloring is of the same intensity.

Colored ink may be applied with an ordinary pen or a soft piece of wood about the size of a toothpick. The ink should be applied near the center of the space to be colored and then worked out to fill in the outline. If more than one color is used on a slide, the first part colored should be thoroughly dry before the second color is applied. After the slide is used the ink can be removed with a special ink remover included in the kit. Regardless of how closely specific directions are followed the first slides may be a bit disappointing. However, actual practice, plus a bit of experimentation, should result in quite neat, artistic, and usable slides.

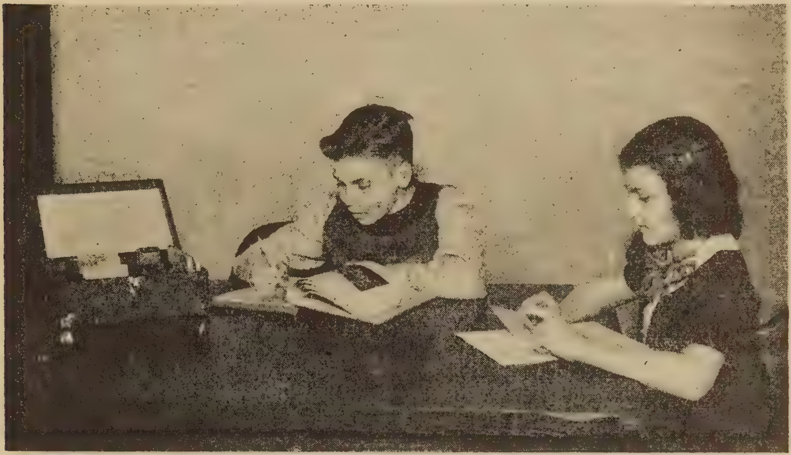


FIG. 47.—Even the younger pupils can produce very creditable handmade lantern slides.

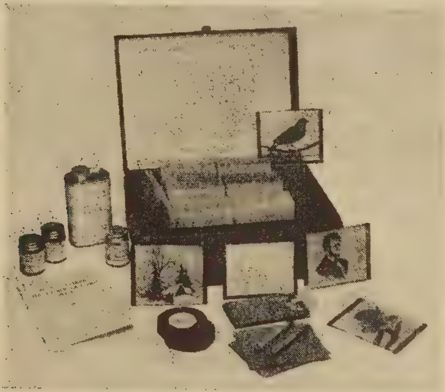


FIG. 48.—An instruction book and all of the materials required are included in this inexpensive slide-making outfit. (*Courtesy of Keystone View Company.*)

India Ink Slides.—A bright and clear outline or diagram may be produced by using India ink on a plain cover glass. A thin coat of shellac on the glass makes a better surface on which to draw.

Cellophane Slides.—This type of slide is used most frequently for projecting written material. To prepare it, first cut a piece of Cellophane, the size of a slide 3¼″ × 4″. Second, cut a piece of carbon paper 6½″ × 8″ and fold the carboned sides together. Place the Cellophane inside the carbon and write or type on the desired material. A great deal of time may be saved by typing and spacing the material on a plain piece of paper before putting it on the carbon. If the material is typed, use the typewriter just as it would be used in cutting a stencil. After the material has been typed on the Cellophane, place the sheet between two cover glasses and tape one side, if the slide is to be used only once, and all four edges, if it is to be added to the permanent collection. Amber-colored Cellophane is more satisfactory than uncolored.[1]

Silhouette and Paper Cutout Slides.—Slides of this type are of special interest to the teacher of lower grades. The figure to be reproduced is cut out of paper and then inserted between two cover glasses. If the object itself is used, the silhouette is obtained when the slide is projected. If, on the other hand, the paper from which the object was cut is used, all the slide except the image will be dark. "Cutout" slides may be made more attractive by using colored Cellophane. Sometimes several colors may be used advantageously.[2]

SELECTING PROJECTION MATERIALS

Because a projected picture is only a flat picture thrown on the screen, the same standards used in the selection of flat pictures (page 113) can be utilized. In addition to these criteria, three other suggestions are pertinent to the selection of projection material.

In the first place, slides or strip film should never be viewed for purchase without the use of a projector. The picture on the slide is so small, and especially on the strip film, that many defects may be overlooked if viewed only with the naked eye.

Second, the construction of the slide should also be critically considered. Some slides are made up of only one piece of glass with a special cardboard binding, while others have the image covered with a second piece of plain glass, and both held together with a special tape.

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[1] A pertinent and recent article is M. R. Webb, and S. O. Wilson, Lantern Slides of Cellophane, *Educational Screen*, vol. 17, pp. 43–44, February, 1938.

[2] Those interested in making slides will find the following references very helpful: Hethershaw, L., "Simple Directions for Making Visual Aids," *Educational Screen*, Chicago; Dent, *op. cit.*, pp. 52–62. See also the references to Angell, Bonwell, Daniels, March, Marx, and Price in the bibliography. A. M. Gale's regular feature in the *Educational Screen* is based on handmade slides.

Either type will give excellent results, although more care is required in handling the lighter weight slides.

In the third place, not too much should be expected from a projection. Some pictures are far more clear and distinct in their original form than in their magnified or projected form. Many of the 35-mm. strip films of today are made up of pictures reproduced from old prints, books, and other sources and often these are disappointing when they are enlarged on the screen.

STORAGE AND CARE OF SLIDES AND FILMS

One of the most important duties of the director of visual education is to provide suitable storage for the projection materials. In storing materials, there are two problems to be solved, suitable protection and accessibility.

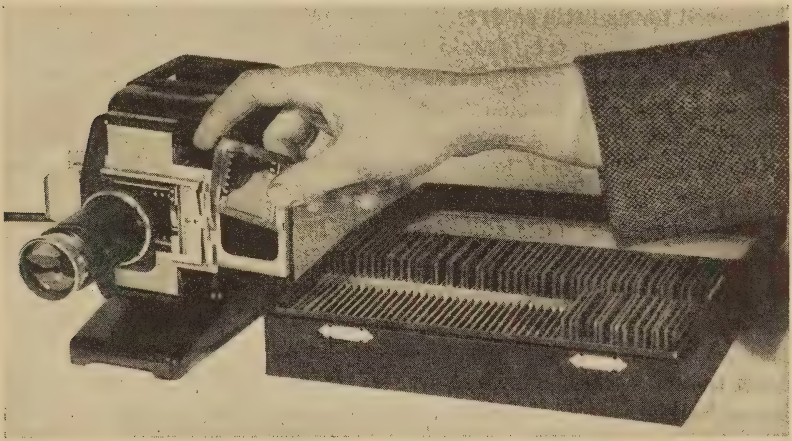

Fig. 49.—A 2″ × 2″ lantern-slide projector and storage box for slides. (*Courtesy of E. Leitz, Inc.*)

Slides of either the standard or the 2″ × 2″ size are generally kept in boxes that will hold up to fifty or more. These boxes are provided with cardboard dividers so that each slide is placed in an individual compartment. The name of the set should be stamped or printed on the box. Each slide should be numbered and titled. Whenever possible this list should be pasted in the lid of the container. In addition, an alphabetical list of all slides owned should be prepared so that the teacher may, without discouraging and time-consuming difficulty, select a set of slides, or several slides from different sets, to meet the needs of her class.

Some storage cabinets are made up of frames that will hold forty to sixty standard slides. These frames when pulled from the cabinet make it possible for the teacher to look at each slide without removing it from the frame. Because of this feature the additional expense for such a cabinet may be justifiable. It would hardly be practical to store the small slides in this manner. Another helpful device is a small cabinet with an opal glass cover over small electric lamps. The teacher may preview the slides by placing them on this cover.

Strip film is usually stored in small tin containers. These containers are only a little over 1 in. high, and thirty-six of them can be placed in a drawer or file 2 in. deep and 12 in. square. Steel cabinets with drawers of suitable dimensions for storing these containers may be secured for a very reasonable sum. A thirty-drawer cabinet may be purchased for as little as $12.

The strip films, too, should be catalogued. A manual to accompany each strip of film, with explanations of each scene, should be prepared for the teachers' use. All commercial strip films are accompanied by such manuals. Incidentally, these manuals are easily mislaid or lost; hence, care should be required in the using of them.

When handled, slides and film should be held so as to avoid leaving fingerprints on the area that will show on the screen. Such marks, if made, may be removed with lens tissue.

The system of handling these materials must be such that they can be readily checked out by the teachers planning to use them. If, in order to secure a projector and a set of slides or a strip film, the teacher is required to waste a lot of valuable time on forms or other red tape, the aids will probably go unused. At the same time some little system is necessary in order that the material may be efficiently utilized and protected.

THE PROJECTION SCREEN

It is quite common to find schools owning a projector, but no screen of any kind. Often the back of a map is used but this is not satisfactory, because the clearness of the picture depends upon the light reflected from the screen. The map absorbs too much light and reflects too little. Therefore, when a projector is being purchased a good screen should also be included in the order.

If only a limited sum is available, a homemade screen may have to suffice. A plain white cloth may be used, if mounted so as to be free from wrinkles. (Oilcloth is usually too glossy for this purpose.) Likewise, a piece of Beaverboard or similar material may be painted with a white flat paint and used. However, neither of these will give so satisfactory service as the specially manufactured screen.

Probably the most important factor to be taken into consideration in the purchase of a screen is the angle from which the students will view the picture. If the room is long and narrow, almost all the students will be seated directly in front of the screen. Therefore only the reflecting quality need be considered. In this situation either the aluminum coated or the glass bead will give excellent results. Screens of this type and of a size suitable for classroom use range in price from $12.50 to $60 depending upon the quality of the screen, the style, and the type of mounting.

If, however, the room is such that students must sit at a wide angle to the screen and so view the picture from the side, then both reflection and diffusion must be considered. In this type of setting the plain white screen will give the best results because it has the greatest power of diffusion. Screens of this type may be secured in the lower brackets of the price range mentioned above.

Where projection is from an elevation, such as a booth, a flat white screen will show less distortion than a crystal-bead screen.

There are three common types of mounting—wall, desk, and tripod. The wall-mounted screen is attached to a bracket or enclosed in a dustproof case hung on the wall. The screen is rolled up when not in use. The desk type is mounted in a long narrow dustproof box. The box, when opened, serves as a base and the screen is held in position by braces. This screen is handy to use, requiring only some object on which to rest. The tripod, as the name suggests, is mounted in a dustproof case and is supported on a three-legged stand. If the projector is to be moved from room to room, either the desk or tripod type of mounting will be more satisfactory than the wall type.

WINDOW SHADES

Shades for darkening the room are more frequently overlooked than the screen. Nearly all schools are equipped with translucent shades and consequently, in order to obtain best results from the projector, some provision must be made for darkening the room. It is well to remember that, at best, only mediocre results can be obtained when the projector is being used in competition with sunlight.

Not only should the room be darkened but also light must be kept off the screen. Therefore, if dark shades are used, channels or some other device should be used to prevent the light coming past their edges and falling on the screen. Channels may be of wood, plywood, or other inexpensive material. Dark shades will cost around $2.50 to

$4 or more, depending upon the quality of the shade and the size of the window. A completely opaque shade known as "No-Lite" is excellent. Here again, if the budget is very limited, the room may be darkened by using building paper and mounting it on regular window-shade rollers or on special screenlike frames.

Further, the room itself must be equipped so that it can be made ready for use without too much trouble. Otherwise the aids will go unused. Harmonizing curtains of monk's cloth or other material, lined with a fine woven sateen and hung on a wire cable across the entire classroom are fairly efficient. It is better to prepare only one or two rooms and let the teacher using visual aids have ready access to them than to try to use the projector in a poorly equipped and prepared classroom.

TEACHING WITH PROJECTED MATERIALS

Because a projected picture is really essentially only a flat picture reproduced on the screen for study by the group,[1] the suggestions given on pages 115–119 are applicable and, with one exception, these need not be repeated here.

This exception is worth emphasizing. Many teachers make the mistake of presenting too many slides or pictures from the strip film at one time or in one period. This is more commonly done with projected materials than with flat pictures, because there are generally several pictures in the set or on the strip film and it is easy for the teacher to assume that her lesson is incomplete unless she has shown all of them. To repeat two sentences from page 118: The test of good picture teaching is not to be found in the number of prints displayed but in the extent to which those that are shown are really learned. Studying a few carefully selected pertinent pictures is much more valuable than merely looking at a greater number.

In addition to the teaching suggestions referred to above, the following are particularly pertinent to teaching with projected materials:

The projected picture may be used (1) to introduce a unit of work; (2) to give information on a particular phase of the unit; and (3) to test the students' knowledge in order to determine points that are not clear and therefore need more emphasis. For example, in introducing the unit "Insects" to a biology class, the set of slides entitled "The

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[1] In An Experiment in Individual versus Group Study of Pictures in Geography, *Journal of Geography*, vol. 35, pp. 360–364, December, 1936, E. Stadtlander concluded that a group study of slides was more effective than an individual study of stereographs.

Importance of Insects to Man" is very helpful. These slides clearly show how insects are beneficial and harmful to man; how insects live; how a knowledge of the life history of the insect is necessary in order to control it; how insects carry disease; and how to control the spread of certain insects. In fact every phase that a teacher would care to develop in the unit is covered in some way. In studying the structure of insects, either "The Anatomy of the Honey Bee" or "The Structure of Insects" will be found very helpful. Any or all of these sets may be used for review or summarizing, and slides from any or all of them may be used for testing.[1]

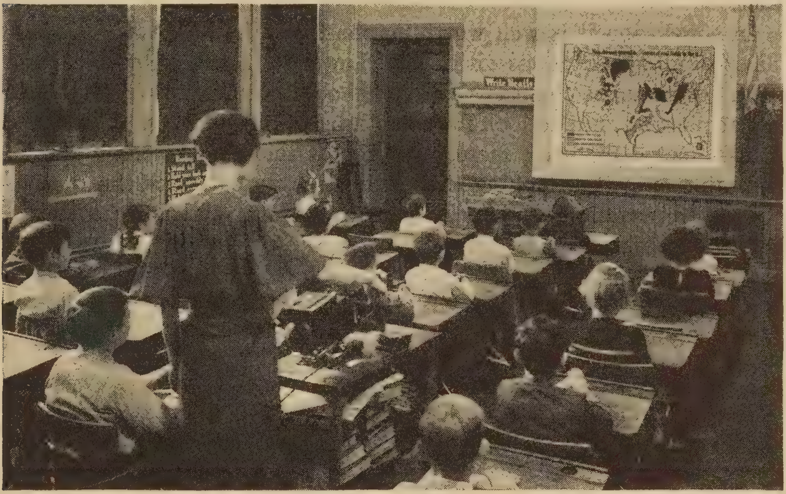

Fig. 50.—The lantern-slide projector being used in the classroom. (*Courtesy of Spencer Lens Company.*)

Slides may also be used advantageously in making comparisons or contrasts. In the development of a unit on the production of rice, for instance, one slide may show the method of harvesting by machines, such as those used in the United States, and another slide show the crude methods of harvesting by hand in China.

In developing certain types of material it may be desirable to project the picture on the blackboard and let the students fill in or trace. Projected outline maps may be used very profitably in this manner, for either instruction or testing.

Slides may often be correlated advantageously with other aids such as the motion picture and the phonograph. For instance, especially when used with younger children, the motion picture may represent motion so fast that the pupils see nothing but action. After the film has been run once for the general picture, the particular points, items, details, or techniques desired emphasized may be shown clearly by means of slides. This allows time for detailed study. Some motion-picture projectors are so equipped that the film may be stopped at any point—and this, of course, really represents the slide idea. Similarly in music, slides may frequently be used effectively in connection with the phonograph in showing music scores or instruments being played, music groups and settings, etc. Naturally, provided the aids are well chosen and articulated, each will enhance the value of the other.

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[1] These sets of slides may be obtained from the U. S. Department of Agriculture.

In conclusion it is well worth emphasizing that "showing lantern slides" is not synonymous with "using lantern slides." As was pointed out in the previous chapter, the pupil should not be allowed merely to look at pictures, but to look for something in the pictures. Similarly, with projected pictures; merely looking at them represents a sort of entertainment, while looking at them in an attempt to find the answers to some important questions represents a truly vital and functional educational procedure.

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See also the references in the preceding chapter.

CHAPTER VIII

THE MOTION PICTURE

The motion picture is recognized today as one of the most powerful factors in the out-of-school education of both children and adults. In a short space of forty years it has had, perhaps, a greater influence in shaping the thoughts, ideas, and reactions of the average individual than any other device.[1] Its weekly world audience, according to Will H. Hays, is 250,000,000 people (weekly audience in the United States, 88,000,000). It exerts this influence because of the realistic settings and situations which it produces on the screen. When one appreciates the fact that it represents motion, sound, and color, he can readily see why the motion picture produces such lifelike situations. And because of its phenomenal development and marvelous possibilities, professional educators have lately capitalized motion pictures for instructional purposes.[2]

History of the Motion Picture.—The fundamental principle of the motion picture has been known for a long, long time. Historical records indicate that it was first discovered and used by the Chinese many centuries before the birth of Christ. This principle is based on the fact that when an object at which one is looking is suddenly removed, the image remains on the retina of the eye for a fractional part of a second. This is sometimes referred to as defect in vision or persistence of vision. Now when a series of different still pictures flashes before the eye, they seem to have acquired the quality of motion. Today the theater audience sees a series of still pictures flashed on the screen in rapid succession. This changing of pictures takes place so rapidly and smoothly that the individual is not aware of the fact that he is really looking at still pictures. In the earlier days when the machines were operated by hand power, a flickering of the picture on the screen was sometimes noticed. This disappeared as soon as the machine was operating again at the normal speed. On the 16-mm. 400-ft. classroom film there are approximately 16,000 pictures or frames. These pass through the projector at the rate of sixteen frames per second in the silent, and twenty-four frames per second in the sound, machine.

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[1] See BLUMER, H., "Movies and Conduct" (Payne Fund Studies), The Macmillan Company, New York, 1933.

[2] Mark A. May makes this prophecy: "Granted that the motion picture is undoubtedly a great aid in the teaching of the course of study as outlined in the lesson syllabi and in the textbooks, nevertheless this use does not by any means exhaust its educational potentialities. I predict that before many years have passed the motion picture will rise from its present subordinated position as a 'visual aid' to at least a coordinated position with the leading subject matter of the curriculum; and that it will become an integral part of the course of study and generally regarded as one of the indispensable elements in the curriculum." The Possibilities of Motion Pictures, *Journal of Educational Sociology*, p. 58, November, 1937.

Up until the latter part of the nineteenth century nearly all experiments with motion pictures were based on drawings, and resembled somewhat our animated cartoons of fifteen or twenty years ago. These were not projected but were used in a sort of "peep-box" device. The earliest attempts to produce photographic motion pictures were made by using several cameras. This was necessary because glass plates were used in these machines. These cameras were naturally cumbersome and slow. It was not until George Eastman of Rochester, New York, had perfected the celluloid film that the way was paved for our motion picture of today.

The next development was the kinetoscope invented by Thomas A. Edison. This machine did not project pictures but was arranged so one could look into a machine and view pictures which seemingly possessed power of motion. The kinetoscope attracted considerable attention at the Chicago Fair of 1893.

The credit for the invention of the motion-picture machine must be given to two Americans, C. Francis Jenkins and Thomas Armat, and one Frenchman, Auguste Lumière. Through the individual and cooperative efforts of these men the projector was perfected. Shortly after the turn of the century the motion-picture theater became an established institution. In a relatively short period of time the motion-picture field has grown until now it is ranked as one of the leading industries of the United States.

Educators have long recognized the great possibilities of the motion picture as a disseminator of information. However, the question, "Is the value of the motion picture as a teaching aid great enough to justify the expense of projector and films?" has been difficult to answer. The investigation of Wood and Freeman gave the first vigorous affirmative answer to this question.[1]

Shortly after the First World War there was considerable interest in the use of motion pictures in the classroom. Many schools bought the 35-mm. portable projector and then found that there were very few films available. As a result the movement was retarded somewhat, and it was really not until after the Wood and Freeman study was made that it began to develop in our country. Soon the first of the classroom films began to appear. Then came central film libraries, on a rental or cooperative basis; these were especially helpful to the smaller schools. Then 16-mm. film on nonflammable or safety stock was developed and marketed. Projectors were improved and simplified, and the prices lowered. All these factors have had an important part in shaping our visual-instruction program of today.

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[1] See Wood, B. D. and F. N. Freeman, "Motion Pictures in the Classroom," Houghton Mifflin Company, Boston, 1929.

Naturally, this development did not come so easily as the above paragraph might suggest. It was handicapped by early failures and discouragements; the antagonism and shortsightedness of Hollywood; the distractions of various other educational movements; the coming of the sound film; the inertia and traditionalism of teacher training institutions; and the popularization of the radio. However, the movement developed, thanks to the sincere and farsighted professional educators and independent workers who struggled with the many problems involved.[1]

ADVANTAGES AND LIMITATIONS OF THE MOTION PICTURE

As in the case of almost any other device, procedure, or process, there are both advantages and limitations to the motion picture.

Advantages. *Depicting Motion.*—The chief function of the motion picture is to depict motion and motion implies continuity. If motion is not an essential part of the representation, a still picture will serve instructional purposes more adequately. Motion, for our purposes here, may be classified as observable and unobservable. The motion film very effectively reproduces both.

Observable Motion.—Through motion that is observable to the human eye, complete processes which normally extend over a long period of time and which take place in various sections of the country may be recorded on the motion-picture film and brought into the classroom. This is the only method by which such information can be made available for the teacher's use.

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[1] A very interesting illustrated history of the development of nontheatrical motion pictures is Arthur E. Krows's series of articles, Motion Pictures—Not for Theaters, running in the *Educational Screen* continuously since September, 1938, and not yet half completed. It is a unique work by a man intimately associated with the visual field for some thirty years past, and represents the most complete and authoritative history of this field ever likely to be written.

A good shorter account of some of the "high spots" in this historical development will be found in F. Dean McClusky's, Will the Film and the School Join Hands? *Education*, vol. 58, pp. 449–453, April, 1938.

The film "From Iron Ore to Pig Iron" (Eastman) is a good illustration of this advantage. In this film the student sees how the ore (1) is mined; (2) is loaded on cars and hauled from the mine; (3) is placed on ore vessels and transported to the smelting centers; (4) is unloaded at the dock and carried to the blast furnace, and (5) finally appears as a rough piece of iron ready to be used in the making of any one of a thousand articles. The theme of the story is carried throughout by observable action, each scene leading to the next process which in turn is explained by action. Thus the continuity of action has been used to depict a complete process. Many of the most popular classroom films, such as "From Flax to Linen" (Eastman), "From Trees to Newspaper" (Eastman), "Cotton, from Seed to Cloth" (Eastman), and "The Romance of Rayon" (Erpi), are of this type.

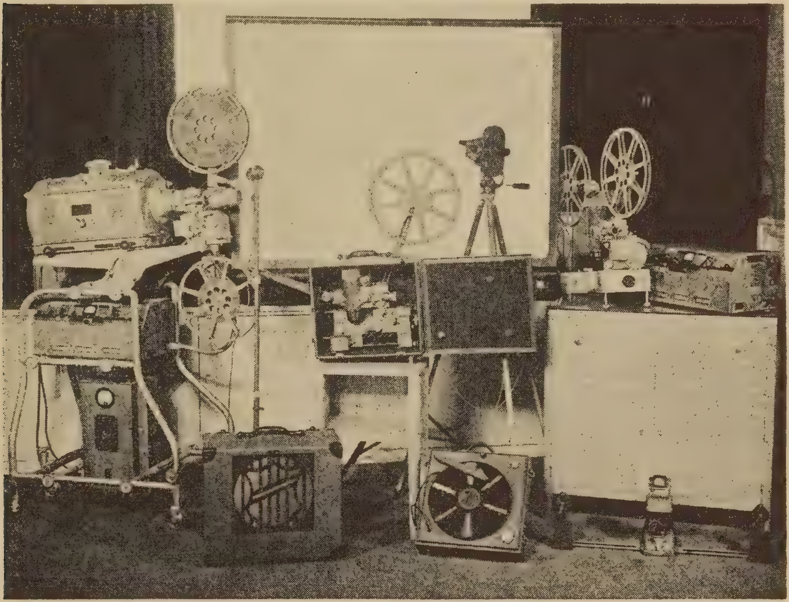

Fig. 51.—Here is an exhibit of sound projectors and equipment. Compare the portable projector in the center with the theater projector on the left. Note the motion picture camera at the back. (*Courtesy of Bell and Howell.*)

Unobservable Motion.—However, the motion-picture film is not limited to a representation of observable action only. Many processes in nature or in industry take place so rapidly or so slowly that it is impossible for the human eye to detect them. Others take place in settings or situations in which they can rarely or with difficulty be seen. Through the use of the motion-picture camera these movements may be photographed and represented on the screen.

Time-lapse Photography.—This unobservable motion is well illustrated in the case of plants the growth of which cannot be detected by one watching the actual process in nature. For example, an individual may be aware of the fact that potted plants turn toward the sun, and yet not actually see the movement. By placing a motion-picture camera near the plant and taking a series of pictures at intervals of 30 minutes or so, this process, which may require from several hours to several days in nature, seemingly takes place in just a few seconds when projected on the screen. In a similar manner the unfolding of a leaf, the opening of a flower bud, the growth of a young plant, the movement of tendrils or vines, and other types of plant movement may be recorded for use in the classroom. The films "The Dodder" (Erpi), "From Flower to Fruit" (Eastman), and "Wild Flowers" (Eastman) are excellent examples of time-lapse photography.

Slow-Motion Photography.—Just as there are many movements which take place so slowly that they cannot be detected by the human eye, there are many which take place so rapidly that the eye cannot perceive them. Here, again, the motion-picture camera is indispensable. By operating the camera at a high rate of speed when taking pictures of a swiftly moving animal or object and running the finished film at a normal rate of speed the pictures show every movement taking place very slowly, so that each one can be studied in detail. Frequently we see illustrations of slow motion in newsreels or in sports reviews. Here, one may see in slow motion a few scenes of a championship boxing match, the finish of an exciting horse race, the take-off or landing of a ski jumper, a successful football play,[1] and many other situations which are made clearer to the audience when slowed up so that each movement can be seen. Photography of this type is not used so very extensively in the production of classroom films, but it is used, and when needed it is very valuable. For example, in the film "Flowers at Work" the student sees clearly the movements of certain parts of the flower during pollination by insects. Most of the value of this section of the film would be lost if it were presented at the normal rate of speed.

Microphotography.—In this, as the name suggests, objects are photographed with the aid of the microscope. By this method tiny

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[1] A good illustrative article describing an actual experiment, is R. E. Priebe, and W. H. Burton, The Slow-motion Picture as a Coaching Device, *School Review*, vol. 47, pp. 192–198, March, 1939.

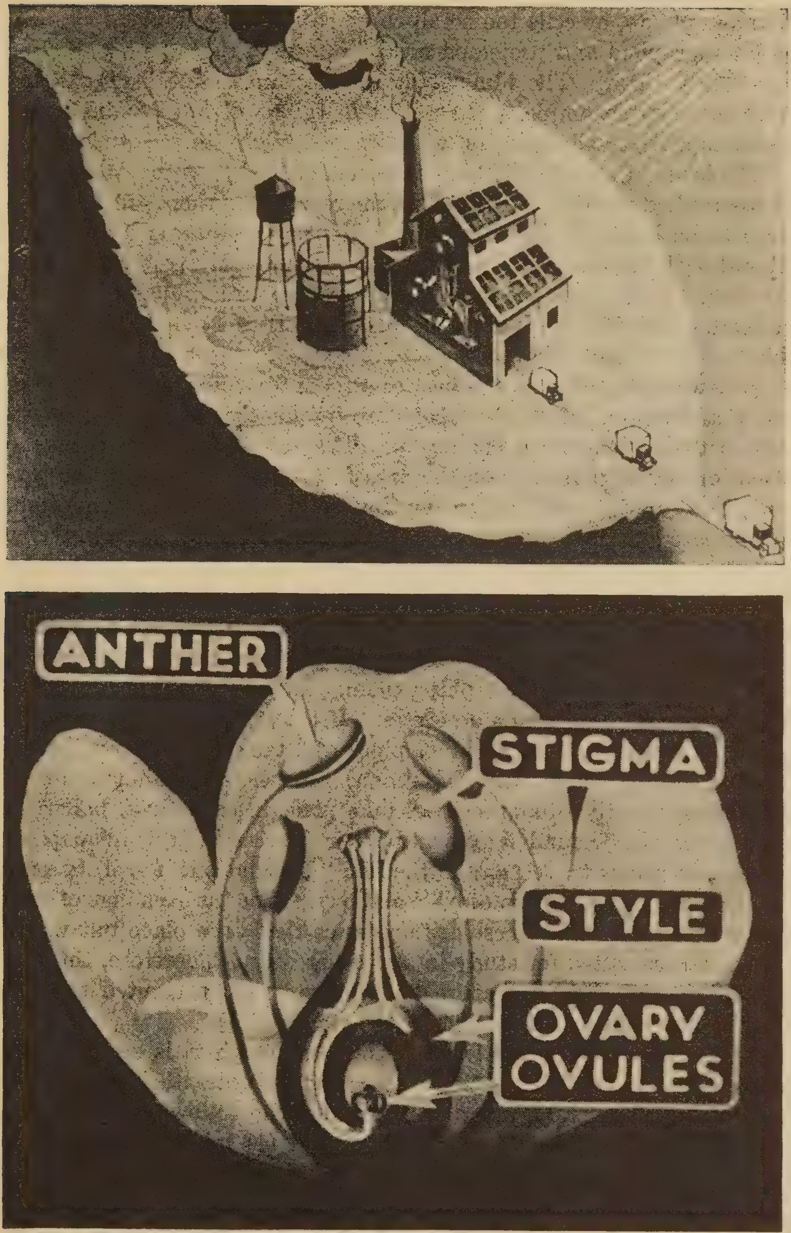

Fig. 52.—Scenes from two animated motion pictures showing how green leaves are food factories, and how the various parts of a flower function. *(Courtesy of Erpi Classroom Films, Inc.)*

animals, plants, or cells too small to be seen by the unaided eye can be photographed and projected on the screen so that the entire class may study them. The film "Microscopic Animal Life" (Eastman) is an excellent example. Films of this type will not eliminate the microscope, but will make its use more meaningful to the student.

Miniature Photography.—Just as there are objects too small to be photographed without the aid of the microscope, so there are areas too large to be included in one picture. Hence, these are set up in the laboratory in miniature form and photographed. Many of the films in the field of physical geography and geology are prepared by this method. The film "Work of Rivers" (Erpi) is a good example of this type of presentation.

Animation.—Many of the best classroom films now available make use of animation. Animated maps are frequently used in connection with history, science, and geography. The purpose here is to focus the attention of the person upon the area from which scenes will be presented, to call attention to the distribution of a product or population, to compare locations of cities with other cities in the same country or with those in other parts of the world, etc. For example, in the film "The Old South" (Eastman) animation is used to show the distribution of population in 1860, also cotton, rice, and tobacco producing areas. Animation is accomplished by first preparing a series of drawings and then photographing them. In this way movement can be used to explain difficult processes. If the student visits a refinery about all he can see is a maze of pipes and tanks. However, in the film "Refining Crude Oil" (Eastman) he sees, through the use of animation, exactly what processes take place in each tank, boiler, or condenser. In "Sound Waves and Their Sources" (Erpi) he may see how sound waves travel; and in the film "Circulation" (Erpi) he may see the exchange of carbon dioxide and oxygen, or the exchange of food and waste products. These are processes that take place but which cannot be presented for study in any other way. Therefore, through animation, processes in nature and industry are presented so that they can be readily understood by the student.

Limitations of the Motion Picture.—Although it is an excellent instructional device, the motion picture has its faults, the most important of which may be summarized under the following heads: (1) cost; (2) distribution; (3) availability; and (4) misinterpretation of function. Doubtless many of these limitations will be eliminated through further study and experimentation.

Cost.—The motion-picture film is the most expensive of all visual materials. This is true whether the school owns the film or rents it.

The very nature of the film is such that even with the best of care it will last only a few years at the most. Few schools, outside the large city systems, can afford to establish their own library of films. To meet the needs of these schools, state and cooperative libraries have been established. But even here the expense is relatively high.[1]

Distribution.—Whether the school maintains its own library or depends upon some outside source for its films the problem of having the film at the time needed remains the same. Any plan based upon the requisition of films several weeks in advance can obviously never be entirely satisfactory.

Availability.—After the film has been received by the school it must be obtained by the instructor in time for him to review it and make definite plans for its use. The lack of an immediately available projector may handicap this preview. Then again, without an extra fee few libraries allow the school to keep the film for a period long enough to get the maximum value from it.

Misinterpretation of Function.—Many teachers look upon the film as a time-filling-in device; some consider it an entertainment feature rather than as an aid in teaching; and some fail to correlate it with other visual aids in the development of a certain unit of work. Appropriate teacher training will, in a large measure, help to overcome this limitation.

VALUES OF MOTION PICTURES IN FORMAL INSTRUCTION

Shortly after the World War people began to realize that the "movie" was exerting a great influence on our social life. To determine the extent of this influence a study was financed by a grant made by the Payne Fund. The conclusions that came out of this investigation are: (1) the motion picture is a powerful factor in education; (2) the child gains a great many facts from the motion picture, and he remembers these facts for a long period of time;[2] (3) attitudes toward social problems are changed measurably by the motion picture;[1] (4) motion pictures arouse the emotions, and (5) they exert a powerful influence on patterns of conduct. The following four established values help to explain these influences.[2]

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[1] This point may be somewhat debatable if one considers (1) the extent to which classroom films replace other instructional materials and (2) the relative effectiveness of teaching with films and teaching by traditional methods.

[2] In his summary of the Payne Fund Studies, W. W. Charters points out the extent to which children acquire facts from motion pictures in these words; "If parents take their eight-year old child to the movies, he will catch three out of every five items that his parents catch. In general, the second- and third-grade children at the end of six weeks remember 90 per cent of what they knew on the day following the show. Three months after seeing a picture they remember as much as they did six weeks after seeing it. Of interest is an implication lying within the fact that very young children remember correctly 50 per cent to 60 per cent of what they see. . . . Children of all ages tend to accept as authentic what they see in the movies." "Motion Pictures and Youth; A Summary," pp. 8–9, 10. These

The Motion Picture Makes the Situation Natural and Lifelike.—The ideal method of learning about an industrial process, a natural phenomenon, or an important event, is to visit the setting and see the item firsthand. In many instances this is, however, impossible. The motion picture approaches this ideal, and is the best substitute for the real field trip. And because the film reproduces accurately the students are naturally more interested in the situation than they would be through reading published accounts of it.

Students Remember Motion-picture Material for a Long Period of Time.—Exhaustive tests have proved that generally students remember facts presented in a film for a longer period of time than those presented textually. This is due to the fact that the child has a better conception of the thing he sees than he has of the thing he hears discussed or reads about. The presentation is more vivid.

The Teacher Can Present a Great Deal of Material in a Short Time.—Here again tests have proved this point. In some cases students instructed through the motion-picture film acquired facts in less than one-fourth of the time required by those who learned the same material from reading and oral discussion. When one considers the numerous courses that have been added to the curriculum, and the extent to which all subject fields have been enriched, the significance of this speeding-up of the learning process becomes apparent. It would seem that this value alone is sufficient to justify the use of the motion picture.

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statements are based on the study by P. W. Holaday and George D. Stoddard, "Getting Ideas from the Movies." Both volumes are published by The Macmillan Company, New York, 1933. See also H. J. Forman, "Our Movie-made Children," and R. C. Peterson and L. R. Thurston, "Motion Pictures and the Social Attitudes of Children," both published by The Macmillan Company, New York, 1933.

[1] In his article, Measuring "Intangible" Effects of Motion Pictures, *Educational Screen*, vol. 18, pp. 237–238, 261, September, 1939, Lloyd L. Ramseyer describes an investigation of other than factual values—attitudes, social awareness, ability to see social implications, and clarity of thinking. Among other things he states, "The evidence concerning changes of attitudes is quite conclusive." The entire January, 1940, number of the *Journal of Educational Sociology* is devoted to the topic, "Some Educational Aspects of Motion Pictures." It includes seven feature articles.

[2] Nearly all the values of both nonprojected and projected still pictures, suggested on pp. 104 and 124 are equally applicable to the motion picture.

Students of Lower Mental Capacity Are Aided Greatly.—Tests given before and after the presentation of a film show, in many instances, a greater gain for the inferior students, because those rated as superior know more facts and therefore make a much higher score on the pretest; their gain from the film is naturally not so great. Generally speaking, many of the inferior students are poor readers; they not only read less than the average and superior students, but what they do read means less to them. Viewing a film gives these a much better understanding of the material presented than they could have obtained by reading. Consequently, they participate more readily and intelligently in the class discussions.

SPECIAL USES OF MOTION PICTURES

Motion pictures may be used advantageously in many settings and situations outside the classroom. The following will illustrate some of the possibilities.

In Vocational Guidance.—Whether the guidance activities of the school are carried on formally as regular courses or more informally as a part of home-room, club, assembly, and other activities, the motion picture will be found valuable in connection with them. Nearly all of the newer industrial films are quite appropriate for this type of instruction. Some, such as "The Skilled Mechanic," "The Farmer," and "The Doctor," have been especially prepared for this purpose.[1]

In Extracurricular Activities.—Motion pictures are used effectively in the instruction of athletes in baseball, football, basketball, hockey, swimming, track events, and other types of athletics. They are also used in connection with gymnastic exhibitions, drills, and marchings, as well as in various kinds of club, music, dramatic, and other activities.[2]

In Giving Publicity to School Activities.—Increasingly school administrators are planning and developing motion pictures reflecting the events, activities, procedures, and interests of the local schools, and bringing these to the attention of parents and patrons through the PTA, graduation programs, and other school-sponsored meetings, as well as through similar meetings of civic, religious, and other local clubs and organizations.[1]

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[1] These and similar films may be obtained from the Herman A. DeVry Corporation, Chicago, Ill. Nearly all state libraries carry some of the films in this series, and some of them carry the entire set. Vocational Guidance Films, Inc., Des Moines, Iowa, has just announced the completion of a series of films covering fifteen occupations.

[2] See Moving Picture Clubs, Chap. V of "Film and School" by H. Rand and R. Lewis, D. Appleton-Century Company, Inc., New York, 1937; and The Movie Club as a Visual Education Project, *Educational Screen*, vol. 16, pp. 285–286, November, 1937.

In Adult Education.—This rapidly developing field provides another excellent setting for the profitable utilization of motion pictures. There are now available many films that may be used in this type of educational endeavor.

In Financing the Audio-visual Program and Other School Activities. Nearly everyone would agree that the entire program of the school should be financed through the regular channel of the board of education, but in some schools, especially in the so-called "extracurricular" activities and in the newer fields of instruction such as audio-visual, music, etc., this is not yet possible. In such instances entertainments during the noon and free periods, as well as at night, even though they are hardly justifiable, can be staged to help provide the funds for these causes and activities.

In Encouraging Intelligent Motion-Picture Consumption.—Because the average individual will consume motion pictures nearly all of his life, it is logical that some attention should be devoted to the problem of making this consumption as profitable as possible to the consumer. And the school is the proper place to provide this instruction because it enrolls all of these future consumers. Teaching discrimination in motion-picture consumption can be done in the same way that any other type of discrimination is taught—by discovering what the pupils like and why they like it, and by critically examining these reasons. Naturally, this program of the improvement of pupil tastes in motion pictures should not be of a high-pressure, authoritative, "now-if-you-don't-like-this-you're-a-low-brow" type (so commonly found in similar programs of music, literature, and art "appreciation"), but by a sympathetic reasoning approach. And in this a free and frank pupil discussion is basic.[2]

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[1] Digests of a number of articles showing how local schools produced motion pictures and used them in public-relations activities will be found in Dale, Dunn, Hoban, and Schneider, "Motion Pictures in Education," pp. 279–285. See also J. H. Hull, Show the Public—Through Movies! *School Executive*, vol. 58, p. 16, 1939; G. M. Elliott, School Films with a Purpose, *Secondary Education*, vol. 8, pp. 74–77, March, 1939; and W. S. Wagner, School-made Motion Pictures for Public Relations in Ohio, *Educational Screen*, vol. 19, January, February, and March, 1940.

[2] Five pertinent references are: BUSH, J. N., Motion Picture Appreciation in the Junior High School, *High Points*, vol. 20, pp. 44–48, September, 1938; DALE E., A Comprehensive Program for the Teaching of Motion Picture Appreciation, *Educational Screen*, vol. 13, pp. 125–128, May, 1934; PEASE, K., Hampden's Course in Appreciation of Movies and Radio; *The Clearing House*, vol. 12, pp. 39–43 September, 1937; RASMUSSEN, G. W., Our Motion-picture Enjoyment Club,

TYPES OF FILMS

During the past few years there has been quite an argument between the proponents of the silent and the sound films. Advocates of the sound film contend that the silent film is now obsolete; supporters of the silent film argue that it is far superior to the sound film as a teaching aid. Both types of films have a proper place in the visual-instruction program of today.

The Silent Film.—There are two apparent advantages of the silent film. The first is cost. The silent film costs only about one-half as much as the sound film. The standard price of the silent film is $24 and that of the sound film is from $36 to $48 per reel. The rental costs of silent and sound subjects run in about the same proportion. In addition, as will be pointed out later, silent projectors also are considerably less expensive than sound machines.

The second advantage of the silent film is its wide adaptability to various grade levels and numerous subject fields. The silent film may be presented from many different angles and therefore adapted to the specific situation. With a little explanation most reading difficulties encountered in the titles can be overcome. For example, the film, "Philippine Islands" might be used in a social-science class in the senior high school in studying the imperialistic policy of the United States, or to show the permanent effects of the period of Spanish domination. Also, it might be used by a junior high-school geography class in studying the products of the Far East. Or again it could be used by classes in the intermediate grades in studying homes and customs of people of other lands.

On the other hand, the silent film is always somewhat at a disadvantage because the students are "sound-movie-minded." The motion pictures they see week in and week out at the theaters are all sound films. Consequently, some little readjustment in mental and physical attitudes becomes necessary. However, in spite of this possible limitation, the silent film will probably long remain an important part of the visual-instruction program.

The Sound Film.—The sound on the film is recorded on the side in the space called the sound track. Sound may be classified in one of three groups: (1) the oral explanation of the scenes or material on the film, (2) a combination of the oral explanation and natural sound, such as the tone of a musical instrument, the crash of a falling tree, or

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School Activities, vol. 11, p. 163, December, 1939; and Spires, L. C., The Movie Club as a Visual-education Project, *Educational Screen*, vol. 16, pp. 285–286, November, 1937.

the roar of the waves breaking on the rocky coast; and (3) a combination of the oral lecture with a background of sound, generally music. Although many of the travelogues and newsreels shown in the school are of this third type, by far the great majority of classroom films are found in the first two classifications.

The chief advantage of the sound film is therefore apparent—a combination of the auditory and the visual concepts. This naturally makes the classroom presentation quite lifelike. Films such as "Sound Waves and Their Sources," "The Brass Choir," and "The Fundamentals of Acoustics" would lose most of their value if sound were eliminated from them. Another advantage is that the oral lecture, which is authentic and properly timed, directs the students' attention to the main points presented in the film. If the teacher is inexperienced in the use of films, or is not thoroughly acquainted with the subject matter in her field, the oral text represents an even more important advantage of the sound film.

The sound film may also be effectively used with a group that is experiencing some difficulty in reading because nearly all titles such as those used in the silent film are eliminated. However, one should not overlook the fact that a spoken word may be just as meaningless as the printed one.

A fourth advantage of the sound film is continuity; it is not necessary to interrupt the theme with explanatory titles as it is in the silent film.

From the advantages of the sound film as listed above, it might be easily assumed that it is far superior to the silent film as a teaching aid. In some instances it might be; in others it might just as certainly not be. As pointed out at the beginning of this section, each of these types of films has its proper place in a program of visual aids. Both are necessary.

CLASSIFICATION OF FILMS

Films suitable for school use may be divided into six groups, (1) classroom films, (2) industrial films, (3) school-made films, (4) documentary films, (5) newsreels, and (6) photoplays. A brief description of each of these types will indicate its possibilities. At the present time the most suitable films are found in the first group.

Classroom Films.—This term is applied to commercially produced films that are definitely designed for use in connection with the development of certain units of schoolwork. These films are prepared by individuals who are familiar with the needs of the school. At the present time the great majority of classroom films may be grouped under one of the following headings: (1) films explaining a process; (2) films giving information; (3) films demonstrating a skill; and (4) films dramatizing an event, episode, or the life of an individual.[1]

Process Films.—Films of this type are used to explain a process in nature, in industry, or in some other fields. For example, the film "Formation of Soil" shows how freezing and thawing help break up rocks and how roots, water, and all the other forces of nature join in the process of forming soil. Other illustrations of process films are "Sewage Disposal," "Electrochemistry," and "From Flax to Linen."

General Information Films.—The many films in this group may be classified as those (1) depicting natural events, (2) showing life and conditions in other lands, (3) depicting life and conditions of other periods, (4) presenting information concerning the occupations and industries of the world.

Films of this type are excellent for building a background of understanding and appreciation of many of the things one sees about him every day. They also give one a much better conception of conditions as they are in other lands.

Natural Events.—There are many very interesting films in this group. Some are suitable for use in advanced classes in biology only, while others may be used in nature study in the lower grades. For example, the film "Plant Growth" shows by means of time-lapse photography the entire development of the pea plant, from the bursting of the seed coat to the distribution of the ripened peas in the pod of the plant. "Flowers at Work," "Leaves," "The Frog," "The Development of the Bird Embryo," and "Energy from Sunlight" all suggest the numerous types of subjects that are to be found in this group.

Life in Other Lands.—In this classification too, are many films, most of which are suitable for use from the lower grades on through high school. Nearly all of these films present information on the topography and climate of a country, on the home life of its people, on its leading industries, and on its outstanding points of interest. The films "Life in the Sahara," "Mexico," "Alaska," and "Philippine Islands" are suggestive of the types available.

Life and Conditions of Other Periods.—These films are designed to give a better understanding and appreciation of life and conditions in the earlier periods of history. One can hardly appreciate the progress that has been made in the last few years unless he can go back and visualize life as it was in the earlier times. In preparing these films extreme care is used to ensure that all materials, methods, costumes, buildings, etc., accurately represent those of the period pictured. In the film "The Old South" one sees the slaves at work in the field, the poorly constructed dirt roads and bridges, the canalboats being moved by mules, the chief method of travel—the steamboat, and, last of all, the home of the planter. After viewing such a film the student can appreciate much better the problems of the South during the period before the Civil War. "Virginia—The Old Dominion," and "Peasant Life in Hungary" are examples of other films of this nature.

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[1] These classifications are not mutually exclusive. Obviously, under certain circumstances probably all films could be classified as "informational." Also, some of the films dramatizing an event, episode, or the life of an individual could be classified as "documentary" or "newsreel." However, for the purpose of showing the main emphases of the various types of films, this classification is satisfactory.

Leading Occupations and Industries of the World.—These films give the student a background of many of the occupations or industries of the world. Unlike the industrial film, which will be discussed later, these contain no objectionable advertising, and neither do they deal entirely with the explanation of an industrial process. They also give more information concerning the lives of the people so engaged than either of the other types. In the film "New England Fisheries" the student becomes acquainted with the life of the fisherman on the boat, the method by which the fish are caught, and the way in which they are cured and prepared for market. Other films of this type are "Lumbering in the Pacific Northwest," "Meat Packing," and "Transportation on the Great Lakes."

Demonstrating a Skill.—At the present time there are very few films of this type available and most of these have been produced in various schools by instructors interested in developing a particular skill. There is one weakness in the majority of these films that is very apparent and seemingly detracts from their value. This weakness is in the method of contrasting the correct with the incorrect way of doing a thing. In general, the incorrect method is so obviously exaggerated that the attention of the students is drawn to the comedy, instead of to the incorrect procedure. The outstanding advantage of films of this type is that correct posture, movement, operations, etc., may be presented to a large group. "Teaching Beginners How to Typewrite," "Teaching Beginners Shorthand," and "Blackboard Handwriting" are examples of films now available.

Dramatizing an Event, an Episode, or the Life of an Individual.—In this group are found many of the films suitable for use in connection with the study of the social sciences and literature. These films are not so abundant as are those in groups one and two. It costs a great deal more to produce films of this type because actors, researchers, and technicians are required. In some instances sections from the older theatrical films are reduced to the 16-mm. stock, and in some cases the entire film is reproduced. As might be expected, many of these reproductions are not satisfactory.

There are many instructors who are demanding films of this type and criticizing the film companies for not producing them. At the present time, however, the sales possibilities of such films are not sufficient to justify large-scale production.

In the dramatizing of events or episodes, the series of films "The Yale Chronicles" is by far the best that has been produced in a non-theatrical field. In this series the films "Wolfe and Montcalm" and "The Declaration of Independence" are examples of those centering around an event. In the former the situations in Europe responsible for the war help to lead into and develop the main theme which centers about Wolfe's daring attack on Quebec and Montcalm's heroic defense of the city. The film "Dixie" is another excellent example of the dramatization of an episode. In it one sees the life of the civilian southerner portrayed from the time the men leave for war until General Lee's surrender. "The Pilgrims," "The Puritans," and "The Eve of the Revolution" are other titles from the same series.

There are now available several films presenting the life of some of the world's leading men. These trace the life of the individual from boyhood on, ending with his outstanding accomplishments or contributions to civilization. "Columbus," "Alexander Hamilton," "Benjamin Franklin," "George Washington," and "Thomas Jefferson" are representative of this type of film.

The Industrial Film.—There has been considerable discussion concerning the use of the industrial film in the school. In some situations these films are barred because of the advertising they contain while in others the school depends largely or entirely on them. Either view is rather extreme, because many excellent films are obtainable from the leading industrial concerns.[1] These films differ from classroom films in that they usually include the name of the company producing them. Few companies producing films of this type issue teacher manuals or other material to explain what is presented because these processes or operations are fully explained through the sound text. If the silent film is used, many of the details will be missing and hence much of the value of the film will be lost because of this lack of explanation. "Alaska's Silver Millions" is one of the excellent films in this group. In it the salmon runs, the methods of handling, and several of the canning processes are clearly shown. This film is available in either silent or sound and is accompanied by a teacher's manual. "Commerce around the Coffee Cup," "The New Romance of Glass," and "Our Inland Waterways" are typical of the numerous industrial films available.

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[1] Three references well worth consulting in this connection are: BERMAN, S., Advertising in the Classroom, "Thirteenth Yearbook," pp. 456–459, Department of Elementary School Principals, 1934; PARKER, H. L., A Plan for Sifting Propaganda in the Schools, *Elementary School Journal*, vol. 33, pp. 277–282, December, 1932; "Report of the Committee on Propaganda in the Schools," National Education Association, 1929.

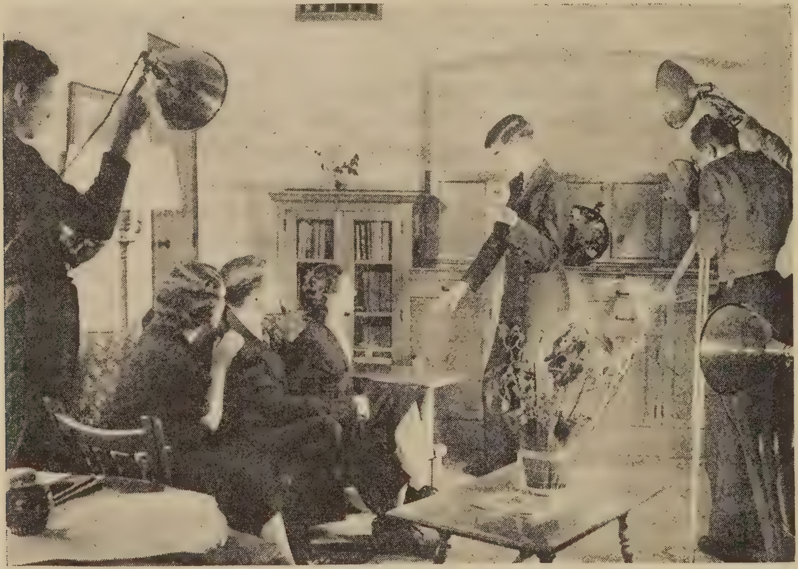

FIG. 53.—Many schools are now making motion pictures. Here a group of Western High School, Detroit, students is "shooting a scene" for the bi-weekly newsreel which has been a regular feature for the last seven years.

The School-produced Film.—Today there is considerable interest in the production of school-made films. Finch, for instance, says "Over 200 schools in the United States are now engaged in the production of films, and the number is increasing."[1] In fact, many schoolmen are turning to the motion-picture film as a means of bringing the activities of their school to the people of the community. There are still others who are experimenting with the production of films for use in the classroom. The interest in this phase of film production is shown by the fact that there is beginning to develop a movement for the exchange of these school-made movies.[1] The process of production is very interesting and undoubtedly the students learn many worthwhile things in producing such films. Naturally the film will be of great interest to the group sponsoring it and to others acquainted with this group, but it very likely will be of little value to the classes of four or five years hence. Also, this production is expensive. Generally speaking, for every 400-ft. reel of school-produced film one can buy two or more of the best classroom films, which are far superior from the standpoint of both photography and continuity. In view of past experiences it would seem advisable for the school producing its own films to secure the services of an expert photographer. The additional expense would be more than justified on the basis of film saved, and on the quality of the product.[2]

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[1] See FINCH, H. R., Film Production in the School, *English Journal*, vol. 28, pp. 365–371, May, 1939. In February, 1940, Finch sent out 104 cards inquiring about school-made films and received 38 reports of actual productions. The *Educational Screen*, in February, 1940, began a new department (conducted by Hardy R. Finch), "School-made Motion Pictures," a monthly cumulative list of school-made films. In March and April, 1940, this magazine published a list of

The Documentary Film.—This type of motion picture, which has only recently been developed in America, is rather difficult to define specifically. Ramseyer says

> It lies somewhere between the strictly factual educational film and the dramatic, fictionized, theatrical film. It resembles the educational film in that it is, or successfully creates the illusion of being, an authentic representation of fact. It resembles the theatrical film in which these facts are dramatized, a human-interest story may be interwoven in it, and many of the techniques of maintaining interest are used which have been successful with the theatrical film.[3]

This type of film has been aptly called "a story of contemporary adventures."

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more than 90 school-made films (with full data on each), most of which are "available on loan to other schools." A brief summary of this investigation will be found in W. G. Hart, A Clearing House for School-made Films, *Educational Screen*, vol. 19, p. 65, February, 1940.

[1] Information may be obtained from William G. Hart, Harvey H. Lowery School, Dearborn, Mich.

[2] See special bibliography at the end of this chapter.

[3] Ramseyer, L. L., "A Study of the Influence of Documentary Films on Social Attitudes," a reprint from "Abstracts of Doctoral Dissertations," No. 27, p. 109, 1938. This nine-page brief of Dr. Ramseyer's dissertation may be obtained from The Ohio State University Press, Columbus. A good popular article is James Miller's, Unreeling History, *Current History*, vol. L, pp. 39–41, May, 1939.

One of the earliest of documentary films was "Nanook of the North," produced in 1919 by Robert Flaherty who photographed the lives of the Eskimos in the Hudson Bay region. This film showed the Eskimos in their daily struggle for food, shelter, and the other necessities of life.

Although this film was produced more than two decades ago, until recently very few documentary films were made. However, now, due largely to the initiative of the United States government, a great interest is being shown in this type of motion picture.

Some of the outstanding documentary films are "The Plow That Broke the Plains," "The Wave," "The Crisis," "The River," "The Spanish Earth," "October," and "Thunder over the Orient." Probably the best-known example is the "March of Time" series. Many of these films are now available on 16-mm. stock.

The main value of the documentary film is that it deals with questions of public issue, and so enters an area into which conventional films hesitate to go. Undoubtedly it influences the thinking and social attitudes of millions of theatergoers; and when it is fully developed for school purposes it will undoubtedly similarly influence the thinking and social attitudes of millions of students.

The Newsreel.—Another type of film that has recently been made available for school use is that represented by the "Newsreel" and the "March of Time" series. Because the content of these films concerns recent events, both at home and abroad, they fit easily into social-science courses. Such titles as "Japan's War in China," "The League of Nations," and "Lessons of the War in Spain," ("March of Time") are illustrative. Films which summarize the outstanding events of the year, such as "Events of 1937," and "1938 Passes in Review," ("Newsreel") are also valuable.

One possible hindrance to the school use of the newsreel is that it is always "late"—it is not issued on 16-mm. stock until after it has been released to the theaters. Of course this would not be an objection to the summary reels. And it may not be a serious objection to the weekly issues because most of the material included is still accurate and pertinent several weeks or even months later. When used to illustrate or supplement some topics or units recency may not even be necessary.

The Photoplay.—Dramatizations of well-known classics such as "The Hoosier Schoolmaster," "Jane Eyre," "Little Men," "Oliver Twist," and "The Scarlet Letter" are now available on 16-mm. film. In general, however, when used for classroom purposes, their cost per student is high, even prohibitive in the smaller schools. Some schools now make use of them as auditorium presentations for the entire student body. Perhaps, in time, if the expense can be reduced, this type of film will be used more widely.

STANDARDS FOR THE SELECTION OF FILMS

Films are expensive and should, therefore, be selected with great care. The standards suggested for the selection of still pictures (see page 113) are quite appropriate when individual scenes of the film are being viewed. The following questions are also pertinent.[1]

1. Can the film be correlated and integrated with the course of study for a particular subject and a specific grade level? Many teachers look upon the film as something set apart from their regular teaching materials. Consequently, much of the value of the film is lost unless it is of such a nature that it can be correlated with the course of study. The film should fit in with other visual aids, such as maps, charts, posters, slides, etc., that are normally used in developing a unit of work or a particular lesson. In addition, the pictures should be such that the pupils in the grade with which they will be used can easily understand them.[2]

2. Is the film accurate? Films should be selected by teachers who are thoroughly acquainted with their field of work, and who are,

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[1] It is difficult to set up standards for sound without taking into consideration the projector used, the conditions under which it is used, and the skill of the person operating it.

A good check list to be used in the selection of a sound film will be found in M. R. Brunstetter, Selecting Educational Talking Pictures, *School Executives Magazine*, vol. 54, pp. 364–365, August, 1935. See also D. C. Doane, What Makes a Good Educational Film? *Educational Screen*, vol. 15, pp. 203–205, 239–241, 271–273, 305–307, September–December, 1936. Chapter IV of "Film and School," by H. Rand and R. Lewis, D. Appleton-Century Company, Inc., New York, 1937, contains excellent material on the use of rating scales, reviews, and criticisms in the evaluation of motion pictures. Chapter V, Moving-picture Clubs, is also pertinent. Although W. M. Gregory's article, Standards of Geographical Film for Instruction, *Educational Screen*, vol. 19, pp. 95–96, 120–123, March, 1940, is built around geography, much of it is equally applicable to films in other subjects and fields.

[2] An excellent reference on available films is "Educational Film Catalogue," published (rev. ed.) in 1939 by The H. W. Wilson Company, New York. Quarterly supplements are issued in January, April, and July, and cumulated in a bound annual volume issued in October. The films are arranged by decimal classification and by subject. All necessary details—length, width, running time, silent or sound, flammable or safety stock, name of producer or authorized distributor, and sales or rental price, as well as full descriptive notes—are given in connection with each film. The 1930 revision lists 2,370 films, all graded as suitable for elementary-school, junior and senior high-school, college, and trade-school use. Another good reference is "Classified 16-mm. Film Source Directory," issued by the Victor Animatograph Company, Davenport, Iowa.

therefore, competent to judge whether or not the material presented is accurate. Costumes, modes of travel, types of tools, houses and buildings, furniture, processes, etc., should be characteristic of the period represented. Then, too, the general idea or theme should be just as accurate and authentic as the picture content of the film. It is entirely possible for the student to get a somewhat distorted idea of the theme of a film in which the pictorial content is authentically reproduced.

3. Are the pictures of good quality? Pictures that are not sharp, clear, and distinct represent a poor educational investment.

4. Are the pictures attractive? Good pictures attract—that is, they are pleasing to view. An unattractive picture fails to interest the viewer and so discourages learning.

5. Is the film limited to the presentation of pertinent facts? Irrelevant facts, processes, or episodes, even though they may be interesting, add nothing but useless expense to a film.

6. Does the film meet reasonable standards of technical excellence? A film should be smooth and steady. The central object, theme, item, or emphasis of the picture should be plain and intelligible. Scenes dealing with certain processes or periods of development, such as the sealing of salmon cans, or the opening of a flower, should be taken in close-ups. All the scenes should reflect good composition. Actors should appear natural and carry their parts well because the children of today are accustomed to seeing good acting; probably nothing will decrease the students' respect for a picture more quickly than amateurish acting. If animation is used it should be sharp, clear, and to the point.

7. Will the film be understood by the students? Teachers should remember that they possess a wider range of knowledge and have had a broader experience than the students and, consequently, not overestimate the understanding of these boys and girls. It is often quite possible for a film which the teacher considers ideal for use in her class to be entirely above the grade level of her students.

8. Is the film of suitable length? Although the length may vary from a few minutes to an hour or more, in general, films of from 11-15 minutes are desirable. The film should, of course, be of sufficient length to carry across the main theme.

9. Is the film a good educational investment? In answering this question one should determine, if possible, the number of times the film will probably be used each year. If it is of such a technical nature that it will likely be used in only one or two classes, then it should be rented, not purchased. On the other hand, if the film will likely

be used several times and in several subject fields, and if care is taken to ensure proper handling and storing it will be more economical to buy than to rent.

10. Does the film possess good motivating qualities? A film which is a "closed and forgotten book" when the students have seen it is usually a poor investment. It should leave the student with a desire to learn more about the material portrayed.

CARE AND STORAGE OF FILMS

Films are expensive both in original cost and in depreciation, but a little care in using and storing them will decrease this expense by adding considerably to their length of service. The life of the film depends upon use, care, condition of projectors, and storage.

Care.—The film should be kept free from grease and dirt. Broken sprocket holes should be cut out before they cause further damage. Broken films should be properly spliced. Rooms should be equipped with rewind machines (so that films may be inspected), splicers, and other equipment necessary in making the needed repairs.

When the film is threaded in the projector proper loops should be left at both the top and bottom of the film track. The sprocket holes should be fitted accurately over the sprockets. The operator should check carefully to see that the film is going through the machine properly as soon as it is started.

The condition of the projector is also a vital factor in the life of the film. If the simple suggestions given on pages 172–173 are followed the projector will not only give more years of service, but will also guarantee a longer life to the film. Proper care of the projector will pay high dividends in added years of satisfactory service.

Storage.—Films should be stored in a room that is relatively cool and one in which there is a rather high degree of humidity. A basement room is generally desirable for this purpose. If the budget will permit, a concrete fireproof and air-conditioned room should be provided.

All containers are provided with a small moisture pad. A few drops of water on this pad every two or three months will help to keep the film soft and flexible. Too much moisture will cause it to warp and the emulsion to soften. Extreme care should be used when adding water to protect color films because these are easily damaged by an excess of moisture.

Shelving should be provided so that each film has its own compartment; any one film can then be removed without moving the others. Titles, if they are not too long, should be placed on the edge of the containers so they can be easily read. If the titles are long, some kind of identification numbers or marks may be used.

MOTION-PICTURE PROJECTORS

In a short time the motion-picture projector will undoubtedly be a standard piece of regularly used equipment in all progressive schools. The light, durable, and inexpensive projectors of today are in sharp contrast to the big, heavy, and expensive machines of a few years ago. Too, the older machines required considerable skill in operation, while those of today have been simplified so that any intelligent high-school boy can, in a very short period of time, he trained to operate even a sound machine. Little wonder schoolmen are beginning to consider the motion-picture projector as an essential piece of instructional equipment.

Size of Projectors.—The size of a motion-picture projector is stated in terms of the width of the film used, and this is measured in millimeters. The theater projector takes a film 35 mm. wide and is therefore classified as a 35-mm. projector. Most films of this kind are printed on inflammable stock and hence there is some danger of fire. Consequently, the 35-mm. projector must be housed in a fireproof booth. The great majority of states also require a licensed, and some communities a union, operator. Because of these restrictions, this size of machine is used in theaters and almost exclusively for auditorium work in the larger schools.[1]

The first projectors made for school use were of the 35-mm. width. However, due to excessive cost of films, expense of transportation, and size and weight of the machines themselves, they were never used to any great extent.

The 16-mm. projector has been accepted as standard for classroom use. The film used is a little less than one-half the width of the 35 mm., is thinner, and much lighter. The 16-mm. films are printed on nonflammable stock and so there are no requirements of fire hazard. Naturally, the machines are smaller and much lighter than the early portable 35-mm. projectors. One of the greatest difficulties to be overcome in the perfection of the 16-mm. machine was the inadequacy of light. A small bulb did not give sufficient illumination and a large one burned the film. But with the improvement of cooling systems for the lamp house most of these machines now give very satisfactory results, not only in the classroom, but in large auditoriums as well.

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[1] The 35-mm. motion-picture projector should not be confused with the 35-mm. still-film projector. The film used in the latter machine is printed on nonflammable stock and consequently there is no danger of fire.

The 8-mm. projector is the newcomer in this field. This was developed to meet the demand for an inexpensive motion-picture projector for use in the home. The film used is much smaller, and costs much less than a similar footage of the 16-mm. stock. Because of the low price of the film, this projector will probably be used extensively for family or home motion pictures. It is not very probable that it will ever be used to any great extent in the schools because (1) of insufficient illumination, and (2) the distortion and fuzziness that would result if the projector were moved back so that the entire class could see the picture. Incidentally, it is well to note that the federal government has 8-mm. educational films.

Types of Projectors. *The Silent Projector.*—As in the still-picture projector, the essential parts of the silent projector are the lamp, reflector, condenser, and objective lens. The motion-picture projector is simply a still-picture projector so arranged as to project a series of still pictures on the screen in rapid succession. The light must be cut off as the pictures change and so a shutter—a rotating metal blade that comes between the light and the film opening while the film is being run —is used. The average 400-ft. reel of 16-mm. film contains approximately 16,000 pictures and requires about fifteen minutes for showing at silent speed. In this period then, the film really starts and stops 16,000 times.

The silent projectors of today are built to meet these specifications demanded by the school situation: (1) lightness in weight; (2) compactness; (3) simplicity of operation; and (4) sufficient light for either auditorium or classroom use. Good silent projectors suitable for classroom use may be purchased at prices ranging from $75 to $175.[1]

The Sound Projector.—This type of machine not only projects the picture on the screen, but also reproduces the sound recorded on the sound track on the side of the film. It is practically the same as the silent projector. The additional parts that are essential in the reproduction of sound are the sound head, the amplifier, and the speaker. Of course, the addition of these parts adds to the weight and size of the machine, as well as to the cost of production.

In general, the standards set up for the silent projector have been adhered to in the production of the sound machine. Many of the newer machines now coming on the market are not much heavier than the earlier silent projectors. The newer machines are compact, easily and quickly set up, and are simple to operate. Also, the higher priced machines may be used in the auditorium as well as in the classroom. The price of the sound projector ranges from $275 up.

[1] A list of companies making these machines will be found on p. 373.

Most of the sound projectors now on the market are so constructed that the amplifier and loud-speaker may be used as a public-address system or with phonograph records. When used as a public-address system, a microphone is attached to the amplifier, and the volume is adjusted according to the size of the room. When used in this manner two loud-speakers give better results than one. A phonograph attachment, similar to those used in connection with the radio, may be used for the playing of records. Phonograph records may be used to provide an appropriate background of music for silent films.

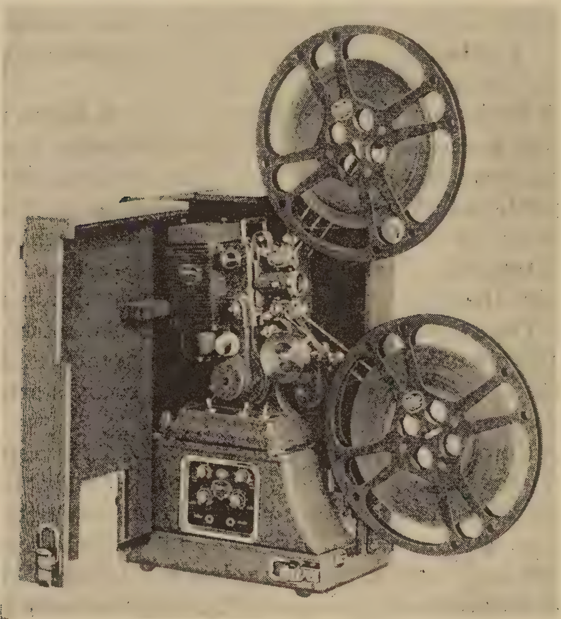

FIG. 54.—A typical 16-mm. sound projector. (*Courtesy of The Ampro Corporation.*)

Sometimes it is desirable to use the microphone attachment for lecturing when a silent film is being shown.[1] Many teachers find it helpful to have the students use this to summarize the film as it is being projected, instead of using the regular lecture on the film.

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[1] Silent films may be used on a sound machine, but sound films cannot be used on a silent projector. Some of the newer silent machines are so constructed that sound films can be used on them, but this arrangement is not very satisfactory because without the explanatory titles and text much of the value of the sound film is lost.

SELECTING A MOTION-PICTURE PROJECTOR

Because the motion-picture projector is one piece of equipment that can be used in practically every classroom, and in connection with almost every subject or activity, it should be carefully selected. A good projector will give years of satisfactory service, and this is far more important than the few dollars that may be saved on the purchase price of a cheap machine.

The State Visual Instruction Exchange of Ohio suggests the following six points to be considered before purchasing projection equipment:[1]

1. Write to the leading manufacturers for information and arrange demonstrations.
2. All demonstrations should, if possible, be held on the same day.
3. Use the same screen for all demonstrations.
4. Use the same trial film, either silent or sound, for all makes of machines.
5. Require all agents to make their first demonstration in the presence of one another. This will ensure against sales tricks.
6. Use the same room and the same number of people in it for sound-projector demonstrations.

In a consideration of the details of a projector the following points should be noted:

1. *Safety.*—The projector should be so constructed that it is mechanically safe to operate. There should be absolutely no fire hazard in either handling or operating.

2. *Illumination.*—In general the projector should accommodate at least a 500-watt bulb, and larger if the room is not completely darkened. A machine that will take a 750-, 1,000-, or even a 1,250-watt bulb may be necessary if the situation requires it but this is, of course, more expensive, because of the bulb used and also the additional power required.

3. *Steadiness of Pictures.*—Flickering or unsteady pictures are tiring on the eyes and therefore decrease the value of the film as a teaching aid.

4. *Focus.*—The entire picture should be sharp and clear.

5. *Operation.*—Projectors should be simple to thread and easy to operate. All parts that are to be adjusted when threading should be easily accessible. All controls for operation should be conveniently located and the lamp house so constructed that bulbs may be changed easily and with little loss of time.

6. *Protection for the Film.*—Devices designed to protect the emulsion on the surface of the film from scratches, to prevent damage to

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[1] *Nation's Schools*, vol. 24, p. 31, December, 1939.

the sprocket holes, and in other ways to check unnecessary wear and tear on the film, are desirable.

7. *Mechanical Construction.*—A good projector, one mechanically well designed and constructed, should give years of uninterrupted service. An inferior machine not only gives poor service but also requires repairs. Replacement parts should be standardized and easily available at a reasonable cost.

8. *Portability.*—The machine should be such that it can be moved easily from room to room. If it is heavy or unwieldy or difficult to set up, the teachers' use of it will be discouraged and handicapped.

9. *Sound.*—The sound should be rich, clear, with good volume range and control. Volume should be loud enough for the largest room in which the machine will be used and quiet enough for the smallest.

10. *Servicing.*—Even the best machines require some attention, and consequently it is well to consider the reliability of the company, and nearness to service centers.

OPERATION, CARE, AND STORAGE OF PROJECTORS

Operation.—Whenever possible, student operators should be trained and used. Such a plan frees the teacher so that she may give more time to the educational phase of the film. Boys who are mechanically inclined can soon learn to operate the machine successfully. In any case, neither teachers nor students should be allowed to operate a projector until they have had sufficient training. Films are expensive and may be ruined easily, on even the most costly machines, by an inexperienced operator. The operator must know (1) how to set the machine up ready for operation, and make all connections with speaker wires and power cords; (2) how to thread the projector; (3) how to focus the machine; (4) how to adjust volume and tone on the sound machine; (5) how to use the microphone and phonograph attachment; (6) how to change bulbs or exciter lamps; (7) how to rewind films; and (8) how to place projector, loud-speaker, and screen so best projection results will be obtained.[1] Good care and efficient operation of projectors will increase materially the value derived from any visual-instruction program.

Care.—Unlike the still-picture projector, there are many moving parts in the motion-picture machine, and it therefore requires more care and attention. Only a person who has been properly trained should have this responsibility. The projector must be oiled frequently. In oiling one should see that no oil is left on the machine to get onto the film. Reflector, condenser, and lenses should be cleaned frequently with regular lens tissue. The edges of the film aperture should be cleaned with a small brush. Lint or dust on the edges of the aperture gives the edges of the picture a ragged and indistinct appearance on the screen. The film track should be cleaned in order to remove all particles of dirt and other substances that might damage the film. Bone scrapers should be used for this purpose. All extension cords and speaker cords should be neatly coiled or wound on a spool when not in use. It is advisable to keep on hand several extra bulbs, tubes, and other parts that may be needed in servicing the machine so that when necessary simple repairs or replacements can be made immediately.

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[1] Screens for the motion-picture projector should be selected on the same basis as those suggested for the still-picture projector on pp. 140–141.

Storage.—When not in use the projector should be kept in a warm dry room. It should be protected as much as possible from dust. Most projectors come in protective cases but in instances where a case is not provided, an inexpensive cover can be easily made out of oilcloth, imitation leather, black sateen, or other similar material.

TEACHING WITH THE MOTION-PICTURE FILM

There are a few motion-picture-minded teachers who need little training, if any, in the proper use of the film as a teaching aid. However, there are a great many instructors who think that the only procedure necessary is to show the film, and that the student will automatically absorb all the information that it contains. When one is planning to use a film he should remember that it is only a teaching aid, and unless properly used it becomes merely an entertaining device. The following suggestions should enable the teacher to plan a more effective procedure when using a film.[1]

The Establishment of Specific Objectives.—A teacher would hardly consider using a map, a chart, a model, a specimen, or a similar teaching aid without having in mind specific reasons for its use. Likewise, she should have certain formulated objectives before using the film, and, further, as in all good teaching, she should acquaint her students with these educational objectives. Here again looking for answers to whats, wheres, whens, whys, and hows is much more profitable than merely looking.

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[1] An excellent book to be used in this connection, a manual prepared for high-school students is E. Dale, "How to Appreciate Motion Pictures" (Payne Fund Studies), The Macmillan Company, New York, 1933. See also Dale, Dunn, Hoban, and Schneider, "Motion Pictures in Education," pp. 11–243; and the reference to Child and Finch in footnote 1, p. 231.

John E. Hansen's article, A Study of the Comparative Effectiveness of Three Methods of Using Motion Pictures in Teaching, *Educational Screen*, vol. 19, February and March, 1940, is pertinent to this discussion. Chapter II of this article briefly reviews previous investigations in the educational use of motion pictures.

Sometimes it may be necessary to show the film several times before all these objectives are achieved. For example, the major objective in using the film, "The Green Plant," may be to acquaint the students with the fact that the chief function of the leaf is to produce food. Or again, the same film could be used to explain in detail the process of photosynthesis. Or again, it might be used to show the growing movements of plants. Regardless of the objective selected, one can expect satisfactory results only when he has a specific purpose for using the film.

Grade Placement of Films.—Nearly all films are prepared with the expectation that they will be used in more than one grade level. One of the major tasks of the instructor before presenting a film is to determine how its content can be stepped up or down to the desired grade. If a silent film is used certain words in the title may need explanation. This is just as true of spoken words if a sound film is used. The teacher will become more adept in adjusting films to the desired grade level as she becomes better acquainted with the techniques of presenting films.

Lesson Placement of Films.—In general, the film may be used (1) to introduce a unit, (2) to give information pertaining to the unit, or (3) to review a unit. If the film is owned by the school, it is possible for it to be used in all of the three ways suggested. The content of the film must be known before one can determine where to use it. Some films may be limited to information pertaining to only one or two topics in the unit. Such a film will hardly serve for introducing or reviewing the unit. If the film is used as a means of introducing a unit of work, it must be such that it will naturally lead to further study.

In some subject fields such as commercial geography there are many films available for each unit. Where two or more films are available, one should consider the sequence in which they will be used.

Student Preparation.—Generally when a school starts using the motion-picture film for the first time, the students view it as a "picture show." This attitude on the part of the pupil is largely due to the fact that he has not been required to make preparation for viewing the film properly. A teacher would hardly expect the student to understand any other educational aid if used in a similar manner, and allowing the student to view the film without making suitable preparation is just as illogical.

Field work may sometimes serve as a means of preparation. It may be used advantageously before showing such films as "Wild Flowers," "From Flower to Fruit," "Flowers at Work," "From Tree to Newspaper," and others of this type. Through field work or other preparation, the instructor should try to correlate the content of the film with the environment of the child. The better this correlation is, the higher will be the educational return from the film.

Laboratory work sometimes furnishes an excellent method of preparing students to view a film. Simple experiments with magnets and iron filings will help the student to understand more fully such a film as "Magnetic Effects of Electricity."

FIG. 55.—One of the many uses of the motion picture—teaching the use of the slide rule. (*Courtesy of Bell and Howell.*)

Reading assignments, map exercises, and other study procedures all have a place, depending upon the nature of the content of the film. Needless to say, the teacher may use any one or any combinations of these suggested procedure.

Presenting the Film.—The teacher should know the content of a film just the same as she should know any other content material before presenting it to the class. However, sad to relate, this is not always the case. A preview will show the content and organization as well as the general treatment of the film, and from these items the teacher should be able to select her own method of presentation. Vocabulary and other difficulties may need to be cleared up, pertinent settings located on maps or globes, situations or backgrounds explained, and significance stressed, in order to insure that the presentation makes a worthwhile contribution.

A proper classroom atmosphere is basic to a successful film presentation. Such an atmosphere helps the students (1) to appreciate the difference between education and mere entertainment; (2) to recognize their responsibility in learning from the film; and (3) to prepare specifically for the particular presentation. It may be created by means of teacher and student questions and explanations, and discussions, dramatization, written reports, the study of models, specimens, maps, still pictures, etc. Student experiences with the content of the film may be discovered and related. Such preparation, if not drawn out too long, will arouse interest and increase anticipation, thus motivating the presentation, and so help to gain maximum results.

Because the majority of experienced teachers agree that it is impossible to get the maximum values from a film by showing it only once it is a logical procedure to plan to present a film at least twice. Sometimes the showing may be repeated immediately, and in other instances it may be repeated a day, or several days, later, depending on the purpose in showing it, the time available, the length of the film, the objectives and materials of the particular lesson or unit, and the interest shown by the students. The teacher herself will have to decide the problem of repetition.

When the film is presented the first time it should be run without interruption and usually, at least, without teacher comments in order to give the students a more or less complete overview—to acquaint them with the general story the film has to tell. Undoubtedly questions concerning the content of the film will arise in the minds of the students but these questions are not expressed or answered during this first showing. At the completion of this presentation, especially if the film is to be repeated immediately, an opportunity should be given for the pupils to state their reactions, raise questions, and discuss freely. This procedure sets the stage for the next showing.

On repeated presentations the students should be encouraged to raise questions at any point and these should be answered or discussed immediately in order to rectify misunderstandings, clarify meanings, or correct misemphases when they most need to be rectified, clarified, or corrected, and when it is easiest to do these. Too, the teacher should be able to point out new materials to be watched for. Many films are divided into sections, thus making it easy to stop the film and discuss each section as it is presented. Naturally, a repetition that adds nothing to the pupils' ideals or knowledge represents a waste of time. Here again, a little experience in teaching with films will help the instructor to acquire skill in their presentation.

Follow-up Activities.—A film that does not arouse interest that may be directed into further learning activities is not suitable for classroom use. Any of the procedures suggested for use when setting the stage for the film will be beneficial. Certainly, further reading will be necessary. Such activities as debating, reading, discussing, planning trips, visiting interesting places on field tours, conducting experiments, etc., are valuable as long as they capitalize the points brought out by the film or in the reading material related to the units of work. In short, interest must go beyond the mere passive participation of viewing the film.

Evaluation in Terms of Pupil Growth.—The acid test of the film is its contribution to the child's ideals, knowledge, and habits. Tests of both the subjective and objective type can be used to determine the contributions of the film. In the smaller schools one would hardly care to use a control group for such purposes, and many instructors are not prepared or qualified to do such scientific testing. However, the results of pretests compared with those of other tests given after the final showing of the film will be helpful in evaluating it. The reaction of the students in the classroom follow-up activities is also indicative of the value of the film as a teaching aid.[1] It is safe to assume that the ultimate value of the film is in direct proportion to the planning of the teacher and the preparation of the pupils.

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[1] For detailed procedures in using the motion pictures in the classroom see Chaps. XI–XIII. For evaluative devices see footnote on p. 165.

[2] By far the most careful, comprehensive, and detailed analysis of the literature on motion pictures is to be found in "Motion Pictures in Education," by Dale, Dunn, Hoban, and Schneider, published by The H. W. Wilson Company, New York, 1938. This 472-page book, prepared under the auspices of the Committee on Motion Pictures of the American Council on Education, classifies and discusses the literature under these headings: The Administration of Visual Aids, Teaching with the Motion Picture and Other Visual Aids, Selecting Instructional Materials, Film Production in Schools, Experimental Research in Instructional Films, and Teacher Preparation in Visual Education.

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CHAPTER IX

SCHOOL TRIPS AND TOURS

Although the movement in American schools to develop it is not two decades old, the basic idea of the school trip, field trip, tour, excursion, jaunt, or journey is not new.[1] Both Aristotle and Socrates used the trip method; Comenius recommended it; Rousseau considered it the chief technique in the education of Émile; Pestalozzi promoted it in his school at Yverdon; and Francis Parker introduced it into his Chicago school. For years trips have been an important part of the practice of European schools of all levels.[2] Although this educational device has developed tardily in the United States, owing largely to the reasons suggested below, judging by the recent and present interest it promises to become one of the major activities of kindergarten,[3] elementary, secondary, and higher schools.

The influences that are facilitating this development of the school trip in American schools are (1) a broadened outlook on the part of parents and professional educators; (2) a sincere desire to capitalize all of the instructional opportunities, materials, and devices available;

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[1] The term "excursion" is common but the authors prefer not to use it because it is too suggestive of a lark or a sight-seeing expedition, neither of which represents the school-trip idea.

[2] School trips were officially sanctioned in England in 1905 and in 1908 were subsidized by the London County Council. The British School Journey Association, which now publishes *The School Journey*, was organized shortly thereafter.

Interesting accounts of foreign practice may be found in T. Alexander and B. Parker, "New Education in the German Republic," The John Day Company, New York, 1929; S. W. Downs, The School Journey Movement in Great Britain, *School and Society*, vol. 42, pp. 541–542, October 19, 1935; C. F. Hoban, School Journeys in England, Germany, France, and Belgium, *Educational Screen*, vol. 9, November, 1930; and English and German Students Make Long Trips at Low Costs, *School Life*, vol. 16, pp. 146–147.

[3] Says Leila V. Stott, "By five years of age, however, the children are ready to be farther afield on school trips. Their block play usually reflects an interest in automobiles, boats, and trains; and following these leads we go often—about once a week in good weather—to near-by docks to watch coal being unloaded onto trucks; or again to railroad freight yards to watch the handling of food supplies . . . " *Progressive Education*, p. 335, April, 1931. For other accounts of kindergarten and primary trips see the references to Clouser and Millikan; Edwards, Edwards, and Clowes; and Stanton in the bibliography.

(3) a recognition and appreciation of the educational possibilities of the school trip; (4) a knowledge of successful European practice; (5) the ease and low cost of modern transportation; and (6) the hearty co-operation of officials of visitation points or objectives.

The Tardy Development of the School Trip in the United States.—Our schools have always scheduled a few trips but up to comparatively recently nearly all of these were of the glorified school-picnic type. That the movement to develop the school-trip idea intelligently, constructively, and vigorously is of recent origin in America is attested by the paucity of pertinent literature fifteen or twenty years ago. Briggs and Merriam in 1921, and Collings in 1923, were among the first to emphasize the importance of this educational device and to describe how it might be utilized.[1] During the past decade a great many articles have been published and addresses have been made on this topic.[2] And nearly all of these are not theoretical discussions but descriptions of trips actually made. Although all this is gratifying, yet it is rather surprising that in America the school trip developed very slowly. One does not have to seek far to find the reasons for this tardy development.

In the first place American education has always been schoolhouse bound; to the average individual "education" has always meant a mosaic of very definite and formal elements—school building and grounds, classes, recitations, assignments, examinations, marks, promotions, regular attendance, punctuality, recess, a highly organized and systematized nine-to-four school day, a Monday-to-Friday week, etc. Because of these elements and their emphases it was but natural that the school should come to be considered, not one, but "the" educational institution of the community. And, as a result, it has always been easy for the average adult to consider any away-from-the-schoolhouse activities as being cheaper, less dignified, and less educative than those inside it. Even today, when such an individual sees a group of pupils visiting a bank, post office, museum, or mayor's office, he usually takes a "what-are-these-kids-doing-here, why-aren't-they-in-school?" attitude. Such a restricted conception has handicapped education in many ways.

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[1] Briggs, T. H., The Excursion as a Means of Education, *Teachers College Record*, vol. 22, pp. 415–419, November, 1921; Merriam, J. L., "Child Life and the Curriculum," World Book Company, Yonkers-on-Hudson, N. Y., 1921; Collings, E., "An Experiment with a Project Curriculum," The Macmillan Company, New York, 1923.

[2] The lengthy bibliography of this chapter was selected from a compilation of several times the number of references finally chosen. The most complete bibliography the authors have seen, containing more than 450 references, will be found in "Field Studies in Schools and Colleges," New Jersey State Teachers College, Montclair, N. J., 1938. The vigor with which the proponents of "visual education" have sought to capitalize and develop this educational device undoubtedly accounts for a great deal of the present interest in it.

The second reason why the school trip came tardily is that American educators did not recognize its innate instructional possibilities and therefore did not provide the leadership necessary to a wholesome development of it. This failure is difficult to account for in view of the fact that the trip has been for so long an important part of European educational theory and practice. Short and long trips, scheduled for both winter and summer, interschool visitation, pupil exchanges, winter and summer camps, youth hostels, and other phases of this movement have been common for years in certain European countries. Perhaps our educators were too busy with their own problems to give attention to this development; perhaps they had relatively few opportunities to learn about it; and perhaps, they, too, felt that the child is educated in a schoolhouse and not away from it. In any case, the average American educator who visits foreign schools is always amazed at the extent to which instruction is carried on outside of the school plant.

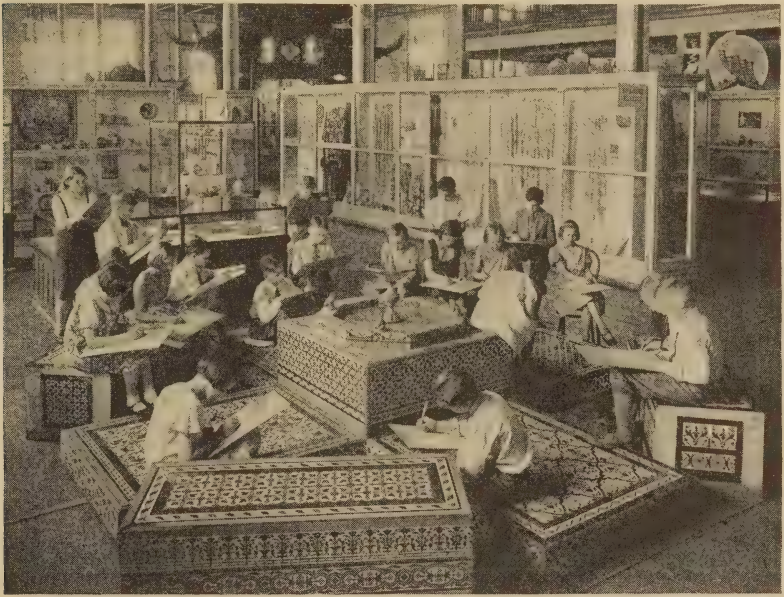

FIG. 56.—A museum offers endless educational opportunities to children as well as to adults. (*Courtesy of The Philadelphia Commercial Museum.*)

The third reason why the school-trip idea has not been further developed is to be found in our mania for organization and system; we worship "businesslike efficiency" and so arrange inflexible schedules, terms, recitations, promotions, and other mechanized and formalized routine the elements of which would suffer if the longer and less regular periods necessary for trips were arranged. "Too much looseness would develop," is the way one principal expressed this idea. After-school, evening, Saturday, and Sunday trips are often scheduled and conducted, but for obvious reasons they are usually not so effective as those taken on regular school time.

In the fourth place, school trips have developed tardily in America because of our lack of experience with them; we do not have the basis of knowledge and experience upon which they must be built and therefore confidence in our ability to handle them successfully. It is much simpler, anyway, for the teacher to assign and hear a book lesson in the formal and easily controlled classroom setting than it is for her to initiate, plan, organize, promote, conduct, correlate, and evaluate a trip with its numerous and perplexing details. However, one must not be too severe on the teacher. Many a teacher realizes the potentialities of the school trip but is so handicapped by a full schedule of traditional work that she hesitates to add to her load. Perhaps, in many instances, we should not be too hard on the school administrator, because he, too, is handicapped by the traditional purposes, organization, procedures, and activities of the school. But all these are changing rapidly, and as one of the beneficial results, the school trip is coming into its own.[1]

THE PURPOSES OF SCHOOL TRIPS AND TOURS

Many justifications of the school trip as an important educational device have been made, but for our purposes here these values will be grouped and discussed under four main heads.

To Capitalize the Migratory Instinct.—Man is an animal and like other animals he is by original nature a migrator; he wants to wander, explore, and "be on the go." He wants to sense new things, have new experiences, meet new associates, and live, temporarily at least, in new surroundings. This desire can often be attributed to a definite dissatisfaction with the present setting and to a correlative belief that a new setting will be more congenial. Even in the case of the runaway boy who apparently "has everything he needs and wants" there is something missing, or some physical, mental, social, or emotional element that is not completely satisfying. And sometimes even he cannot logically explain or justify his actions at all. Probably this urge to migrate is nature's method of insuring continued existence; certainly it is in the case of migrating birds, insects, and animals. In any case, the boy who "plays hookey" is only acting naturally. His teachers, when they were his age, felt the same craving, and probably, too, many of them also played truant.

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[1] According to Atyeo (see reference in footnote on page 195) Philadelphia was one of the first cities, and Pennsylvania's State Department of Visual Education was the first state education department, to give official recognition to school trips. The Association of Childhood Education first sponsored the idea nationally. "School Tours," *Circular* 177, Office of Education, January, 1939, is an investigational report of school trips "lasting at least one full day and participated in by a considerable number of high-school pupils."

FIG. 57.—A "modern" educational setting that is as old as the hills. (*Courtesy of Brooklyn Children's Museum.*)

The unenlightened teacher labels the expression of this inner drive "unnatural," "immoral," "detrimental," "vicious," or "unsocial," and attempts to suppress it. The enlightened teacher recognizes it as natural and seeks to discover ways and means of capitalizing it for wholesome educational ends. She capitalizes it in two ways; first, vicariously, by having the pupil project himself into his history, geography, English, foreign language, music, art, commercial work, or science, and live, in his imagination, the lives of other individuals in other times and in other climes.[1] In the second place she capitalizes it through actual trips to near-by and distant points where the pupils have direct experience with individuals, events, activities, and things which help to interpret and enrich the material of these subjects. In short, the school trip, properly initiated, planned, organized, conducted, correlated, and evaluated, represents an excellent capitalization of this migratory urge.

To Acquaint the Pupil with His Environment.—The main objective of education—wholesome citizenship—must of necessity be based on an intelligent interest in, and an accurate knowledge of, the elements of one's environment—ideals, traditions, history, customs, organizations, institutions, things, and relationships—as reflected in the many phases of its social, physical, industrial, commercial, professional, emotional, recreational, educational, and spiritual life. Some of these fundamentals may be acquired from casual contacts and relationships, some from formal school objects, and some from extra-

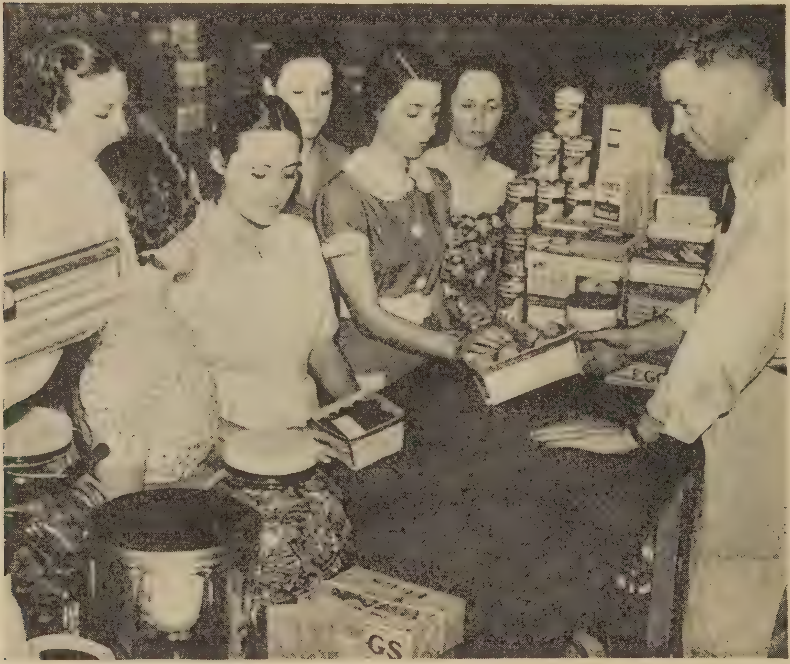

FIG. 58.—These Augusta, Georgia, girls are learning, in an actual life setting, to buy groceries intelligently.

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[1] See the discussion of "The Imaginary Tour" on pp. 191–192.

curricular activities, but many of these experiences are incomplete, inaccurate, and unintriguing because they come indirectly; often, too, they are unorganized and unsystematized and so represent merely miscellaneous accretions.[1]

However, when the pupil in a purposeful and definitely planned trip visits a fire department, court or council in session, post office, charitable institution, industrial or commercial establishment, famous memorial, natural wonder, or scenic beauty, he gets information that is more or less complete, accurate because it is correlated with some idea or relationship that is being presented in his schoolwork, and vital because it is direct and firsthand. Even in trips to more distant points he is really becoming acquainted with his own community because these represent things which his own community might or might not profitably have, and also the relationships of these to the institutions, individuals, events, and activities of his own community. The importance of these trips becomes all the more evident when it is realized, as has been suggested before, that man's modern life is far more complex than it was when the community was largely independent and self-sustaining.

W. M. Gregory very aptly evaluates school trips in these words:

> Education has been too far removed from the basic experiences of modern life. Many schools are quite deficient in opportunities for sense perception, exploration, and raw experiences. They need fewer words and more activities with things, situations, conditions and relations. For useful learning pupils require experiences with the raw materials of life. A garden, a shop, a live animal collection, trip to a farm, a mill, a store, a fire station, a post office, a park, a museum, etc., all have a place in the modern school. Many of these raw materials and elementary experiences are so common to the adult that their importance to the child is apt to be overlooked.[2]

To Interpret, Enrich, and Supplement Curricular Experiences.—Much of the usual curricular work of the school is formal and academic and hence it lacks vitality. The average bookish description of a waterworks plant, the workings of a bank, the publication of a newspaper, the activities of a city council, the significance of some great memorial, or the wonders of some natural phenomena are unappealing to the average student because they are more or less remote from reality. Of course, these book accounts are necessary, but how much more interesting and meaningful they become when they are supplemented by actual firsthand experience with the items in their functional relationships or settings; when the pupil sees how water is obtained, purified, and distributed; when he follows a check through the bank; when he witnesses the getting out of the newspaper; when he listens to the discussions in the council chamber; when he stands in reverence before some memorial or in awe before some natural phenomenon. Seeing a beautiful church, hearing the machinery in a factory, smelling the odors in a gas plant, feeling the heat in a steel mill, or tasting samples in a bakery, give quite different experience than would be gained in merely reading about them or even in looking at pictures of these items. Such experiences are not complete in themselves, they must be very definitely related, both before and after, to the organized material of the courses. But they certainly can most appropriately and effectively interpret, enrich, and supplement the formal accounts. Hoban, Hoban, and Zisman state, "The school journey . . . is the most real and the most concrete of the visual techniques . . . and it is the most accessible and often the least expensive."[1]

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[1] Hoban, Hoban, and Zisman (see bibliography) tell how one group of pupils ". . . assembled a weird collection of piano boxes, pasteboard cartons, orange crates, . . . out of which they hammered together what was supposed to be a post office . . . went through the motions of buying stamps, writing and mailing letters, and delivering mail. Not two blocks from the school was a real post office . . . where real stamps could be purchased, . . . real letters could be mailed to real people, and from which real replies to these letters could be received, delivered by a mailman in the flesh" (p. 29).

[2] GREGORY, W. M., Modern Aids for Experiences in Learning, "Materials of Instruction," "Eighth Yearbook," pp. 85–86, Department of Supervisors and Directors of Instruction, 1935.

The school trip is educationally profitable also in more general ways. The pupil's interest in the work of the world, as represented by its literature, history, science, art, music, events, personages, and activities, is stimulated, and consequently the extent of his knowledge and appreciations is increased. With this comes an increased ability to discuss, explain, talk about, and write about—all of which represent functional educational settings and media. He learns to observe more closely, to understand relationships and implications, and to discriminate and appraise in terms of relative importance; in short, he learns to think more clearly about these various items and their social significances. Further, his range of interests is broadened and his standards of leisure are raised in quality because of these trip experiences.

To Give the Pupils Actual Practice in Purposeful Planning and Executing.—A good school trip does not just happen; it must be wisely conceived, ably conducted, and profitably capitalized. The numerous details of purpose, points or objectives, plans, organization, execution, and utilization must be thought through, evaluated, selected, and carried out. There are three possibilities in this connection: (1) the teacher may do all of the planning and executing; (2) the pupils may do these; and (3) the teacher and pupils may together work out the details and handle the event. Although the first possibility may result in desirable efficiency, yet it robs the pupils of educative opportunities. The second plan is not feasible. The third plan is the best of the three because it capitalizes both pupil and teacher interest and experience and so helps to make the event attractive and successful in its direct effects in connection with classwork, and in its indirect effects, through the very real and natural experiences which the pupils receive in helping to plan, organize, and execute it. This purpose of the school trip is not so important as the three others discussed because of its limited possibilities, but it does represent a minor value of some little merit.

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[1] HOBAN, C. F., C. F. HOBAN, JR., and S. B. ZISMAN, "Visualizing the Curriculum," p. 30, The Cordon Company, New York, 1937.

TYPES OF SCHOOL TRIPS

The school trip is usually understood to mean a short morning or afternoon journey to some neighboring building, museum, program, office, or plant but although this is the most common type, it is not the only one. There are several other kinds of trips which schools increasingly are finding profitable. A brief explanation of each of these will indicate its general field and opportunities.

Local School Trip.—This, the simplest type of school trip, is one in which the group visits various points, parts, or sections of its own building and grounds. It may be a visit to another class, the office, the engine room, the stage of the auditorium, the motion-picture booth, shop, laboratory, or other inside point of interest where the relevant processes, procedures, equipment, and materials are explained and discussed. The outside trips are to the school grounds for such purposes as measuring distances; laying out a baseball diamond; plotting an acre of ground; demonstrating and practicing health and safety procedures; studying trees, shrubs, flowers, or soil, or the architecture of the building; watching, checking, and studying traffic past the building; or practicing safety in the street. Many schools make use of the most appropriate of these trips in the orientation of their new pupils. However, other trips in this category may easily grow out of regular classwork. Usually these trips require not more than a regular school period and are scheduled in these periods.

Community Trip.—This is the usual "field trip" to some near-by exhibit, farm, fishery, library, woods, railway station, wharf, or other objective outside the school. It is the most popular type of school

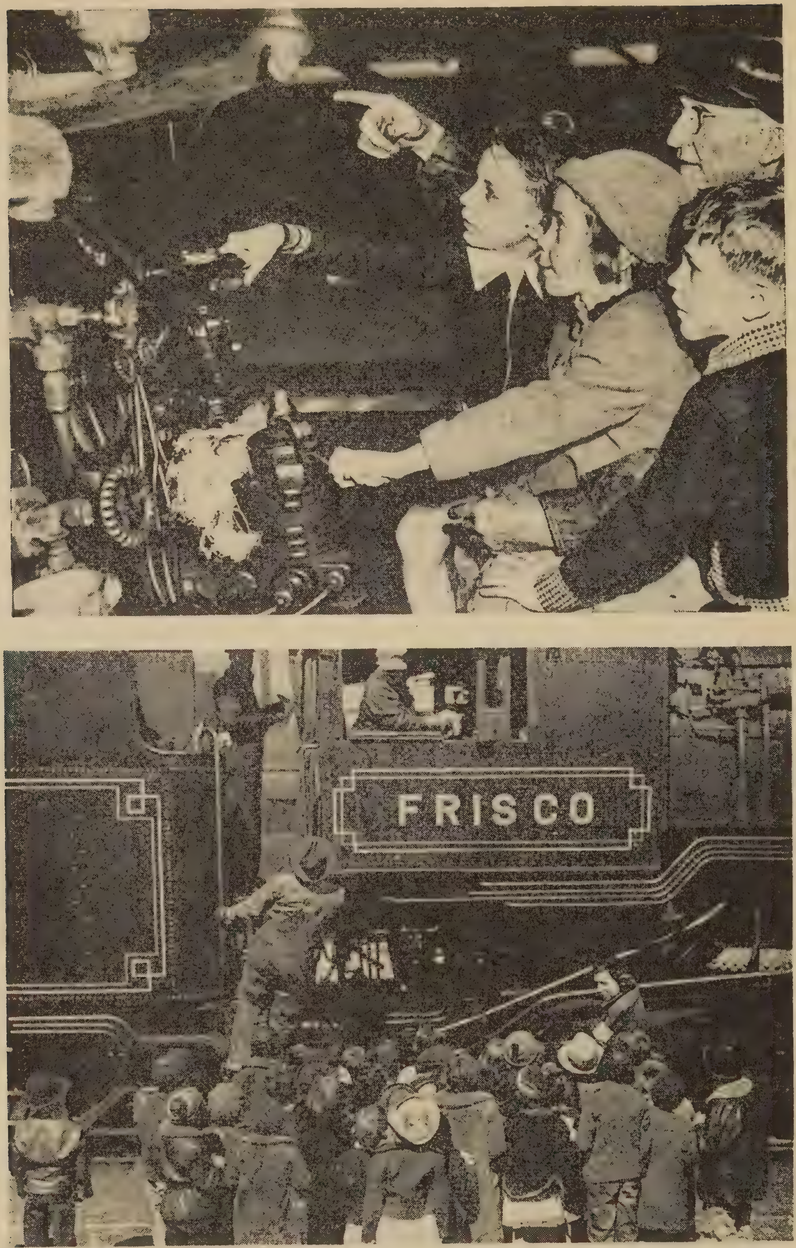

Fig. 59.—Railroad depots, offices, yards, trains, and even locomotives are justifiable objectives of school trips for both younger and older pupils. (*Courtesy of the Atlanta, Georgia, and Springfield, Missouri, Public Schools.*)

trip. It usually requires a longer time than a single period, often a half-day, and sometimes a day or two. Often these trips are taken during the evening and on Saturday as well as on regular school time.

Tour.—The tour or journey is a trip lasting several days, a month, or even an entire summer[1] usually made to some more or less distant objective. This type of trip is developing fast in America due to (1) the influence of the practice in European schools; (2) common practice in America of overnight hikes, trips, and camps by the Boy Scouts and other organizations; (3) the success of these trips in some high schools; and (4) the ease of transportation. Extended trips by smaller groups such as a judging team, prize winners, exhibitors, and contestants, as well as by larger groups, such as a class or even occasionally by an entire school,[2] to such objectives as the state capital, national capital, a large city, a natural wonder, a great exposition, a college or university, the schools of another city, or a tour including several of these and similar objectives, are becoming popular in both elementary and secondary schools. The pupils are transported by school, or specially chartered busses, by automobiles, or by train (often at reduced rates), and stay in hotels, college dormitories, Y. M. C. A.'s, Y. W. C. A.'s and similar institutions, in their trailers, in cabin camps, in tents, or in private homes as guests of children of about their own ages.[3] The responsibilities in this type of trip are greater, the expenses are heavier, and the planning, organizing, and executing are more complicated. However, these are not unsurmountable difficulties. We may expect to see a considerable development of the school tour within the next few years.[4] Perhaps, in time, we shall even have international tours.

The Imaginary Tour.—This type of trip does not differ from the tour discussed previously except that it is not actually made. All the details of the real tour are investigated, studied, and planned. Materials are collected, decisions are made on trip objectives, and all of the other items such as routes, cost, passports, places and objects of interest, and the like are decided upon and theoretically arranged. The objectives are "seen" by means of motion pictures, slides, stereographs, photographs, maps, objects, specimens, models, talks, reports, and phonographic records (for music). Usually this type of trip grows very easily and naturally out of regular classwork in literature, music, history, geography, art, or some other subject, and naturally is very closely correlated with it.[1]

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[1] A group from the Riordon School, Highland Falls, N. Y., recently spent three months in Washington in a firsthand study of the federal government.

[2] A group of 487 students from the Dover, Ohio, High School recently took a three-day trip to Washington, traveling in a twelve-coach special train. Stephens College, Columbia, Mo., has featured an annual tour for fifteen years. The 1940 tour to Mexico was made by 600 girls traveling in three educationally equipped special trains. Six days were spent in and around Mexico City.

[3] Information concerning hostels—inexpensive stopping places for young people—may be obtained from American Youth Hostels, Inc., Northfield, Mass. More than seventy-five of these hostels have been established in New England and many more are being promoted in all parts of the country. A description of an interesting European practice will be found in R. W. Heingartner, Municipal Lodging Houses for Visiting School Children, *School Life*, p. 19, September, 1926.

[4] Three other pertinent references on the tour are: COLLIER, R., JR., The "Rebel Rangers" on School Journeys, *Educational Screen*, vol. 15, pp. 140–142, May, 1936; SCHULTZ, F. G., Educational Joyriding, *School Executive*, vol. 57,

Interschool Visits.—This type of trip is somewhat similar to those which have already been discussed. In general, its aims, organization, and execution are about the same. The main differences are in

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pp. 485–486, June, 1938; Woods, W., High-school Seniors Take Educational Tours, *School Activities*, vol. 8, pp. 254–256, February, 1937.

The first article is an interesting description of how the "Rebel Rangers" came into existence nine years ago, of how they bought their own bus, and of their educational and social activities. Approved applicants for membership, after having proved their fitness by making an overnight trip with the club, become Junior Members. After four months of satisfactory junior membership they are voted into the club. This group, which contains about 100 students, travels about 3,000 miles each year.

The Haw Creek Township High School, Gilson, Ill. (enrollment, 100 students), has had a very complete schedule of weekly trips for several years. In addition, a tour is made, at the close of school in the spring, in one or more of the school busses. The students pay their own personal expenses and the School Board pays the balance. The objectives and distances of the last four tours are: 1937, Eastern states, 2,100 miles; 1938, Northeastern states and Canada, 3,200 miles; 1939, Southern states, 2,500 miles; 1940, Western states, 3,300 miles. Beginning with 1941 this four-year schedule will be repeated. These two-week trips cost the students around $20 each.

A pertinent and promising recent development, the proposed High-school Travel Association, in which member schools would provide school rooms for sleeping quarters and cooking facilities for overnight stops, is described by R. G. Ruste in Students All over the Map, *The School Executive*, vol. 58, p. 17, December, 1938.

[1] Three good references are: Cole, G. C., An Experiment in Integration, *Journal* of the National Education Association, vol. 28, pp. 46–47, February, 1939; Thorpe, G., An International Good-will Tour, *The Instructor*, vol. 46, pp. 13, 65, 80, May, 1937; Williams, P. T., A Visit to the New England Capes, *Educational Screen*, vol. 15, pp. 142–143, 173–175, May, June, 1936. The last article includes all of the plans for the particular unit from the first assignment to the final test. A brief of this article will be found on pp. 298–300 of this volume.

The Travel Section of *The Instructor* contains short and profusely illustrated articles that represent excellent material for the imaginary tour. For sources of other material see pp. 369–370.

general purpose, length of period, formalities, and activities. There are three types of this interschool visit.

In the first type, a particular specialized group such as a class, group, council, committee, publication staff, or music club visits the corresponding organization of the other school in actual session or meeting, thus providing for an exchange of ideas and plans relating to their mutual interests.

In the second type, a group, class, or even an entire grade visits the other school for a half-day or day. The hosts welcome their guests with an assembly program, assign leaders to conduct them to the various classes and activities about the school, or better still, assign each guest to an individual host who assumes responsibility for him for the entire day, and schedules a tea, dance, party, swim, game, or other social or athletic feature for them at the end of the day. The guests, individually and through their leader, thank their hosts—pupils, teachers, and principal—before leaving. Usually the guests later invite their hosts for a return visit.[1] An extension of this plan, somewhat common in Europe, is that in which schools exchange groups,

Fig. 60.—How much more real Lincoln will be to these Oakwood, Missouri, students after their visit to his old home at New Salem. This shows one of the "dog-run" cabins, two houses with a "porch" between them.

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[1] Excellent and practical ideas will be found in R. Helms, Why Not Student Visitation? *School Activities*, vol. 7, pp. 26–27, April, 1936. See also footnote 1, on p. 194.

classes, or grades, for a whole term, sometimes for an entire year, the visitors being taken into the homes which the other children have left.

A third type of interschool visit, one increasing rapidly in popularity in the United States, is that in which the top grade or class of one school is invited by the next higher school, junior high school, senior high school, or college, to come as its guest for a day. The main purpose of this arrangement is to interest the students in the higher school, give them a bit of orientation, and stimulate them to anticipate entering it the following year. The general plans and organization of this type of visit are practically the same as those of the second type described above. Needless to state, this type of trip well merits the recognition it is now receiving.[1]

The Individual Trip.—In this the pupil takes the trip by himself, either because of an assignment of some particular responsibility in connection with curricular work, or because of his own specialized interests. Obviously, because of its very nature it is usually most vital and functional. The pupil who goes to the city library, museum, or a meeting to gather material for a class report, to the woods or fields to collect objects or specimens, to some home to talk with an "old-timer," to some project or setting to sketch or take pictures, or to the railway station or bus terminal to obtain travel folders or timetables—this pupil is "on his own"; he learns to recognize, appreciate, accept, and discharge responsibility, and these are important elements in any education.[2]

SUGGESTIONS FOR PLANNING, PROMOTING, AND CONDUCTING SCHOOL TRIPS

The worth-while school trip is a carefully thought out, planned, and capitalized educational opportunity. It is never a mere on-the-spur-of-the-moment, or a sort of hurried "get-into-your-wraps, let's-go-somewhere" event. Any trip is important not only in itself but also in its effects on future trips. A successful event will promote the healthy development of this device, but an unsuccessful trip will discourage it. Therefore, especially because the device is relatively new in most schools, it is better to build slowly and substantially instead of hurriedly and flimsily. Teachers who are enthusiastic about trips may chafe at the apparent slowness of the development, but at the same time, they, too, will appreciate the importance of correlating enthusiasm with competency. The following suggestions are designed to facilitate the development of this competency.[1]

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[1] See Dean Fitzgerald's article, An Eighth-grade Day in the High School, *School Activities*, vol. 9, pp. 319–320, February, 1938, for a description of one of these visits.

[2] An account of individual trips which the writer states "played the largest part in the school program," will be found in B. Elliott, Excursions in Appreciation in the Small Town School, "Thirteenth Yearbook," Department of Elementary School Principals, pp. 286–287, 1934.

Lead the School and Community to Recognize and Appreciate the Educational Values of the School Trip.—It goes without saying that the success of school trips depends basically on the teachers, not only because these teachers will have to do the necessary planning, conducting, and utilizing but also because every one of them will be affected directly or indirectly by these trips and therefore will have to take attitudes toward them. A wholesome and hearty support of the faculty is essential. Probably few teachers have had much practical experience with school trips and so the first step in the development of this device is to educate properly the faculty itself.

These teachers will represent many combinations of interest, knowledge, and experience, varying all the way from the one who has none of these to the one who has a good supply of all of them. Faculty support can never be developed by the principal merely expressing his own opinions and forcing the teachers to accept them just because they are his. Free and open faculty discussions; a study of available literature; reports of visits to schools which promote successful trips, and from the teachers and pupils of these schools; and finally, a survey of the local possibilities, are some of the media through which faculty interest and support may be developed.

The pupils will have to be enlightened concerning the general ideals, purposes, and practices of the school trip so that they, too, will take proper attitudes toward the policy and carry support and accurate information to their parents. This enlightenment can be attained through the school publications, home-room and assembly programs, bulletin-board displays, and reports from representatives of other schools having successful experience. As implied above, this education is general rather than particularized although it is, of course, well illustrated with examples from actual practice. Instruction in the specific details is given just before the trips are taken.

A third important group which must be suitably educated is the community itself, because a trip concerns its children, its settings, its employees, and its educational expenditures. Here again, because of the newness of the activity, instruction designed to break down the traditional belief that any education obtained outside of the school building is relatively cheap and unprofitable will have to be promoted. There are two possibilities in this connection—to plan and conduct a few trips and thus prove the value of the activity, or to educate the community, win its support, and then promote the trips.

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[1] Probably the best single longer reference is Henry C. Atyeo's "The Excursion as a Technique," Teachers College, Columbia University, 1939. This book includes a wealth of practical material concerning all details of school trips.

The weaknesses of the first plan are at once apparent: due to inexperience or other causes there is a danger that the trips will not be completely successful; and also, that the resultant attitudes taken by parents and patrons will be on the basis of incomplete information and improper appreciation—that they will represent snap judgments instead of careful appraisals. Such judgments, especially if they are adverse, will be very detrimental because it is always more difficult to change a person's mind once it has been made up than it is to help to formulate opinion before a decision has been made. In general, it is obvious that educating the community first and then promoting the trips is a more desirable procedure than the reverse. Further, this procedure will bring an added demand, due to the extent of the publicity given in promoting community education, that the trips be successful. This demand should stimulate to additional efforts on the part of the teachers and so help to insure efficiency and effectiveness.

This trips-instruction may be brought to such groups as the board of education, PTA, mothers' clubs, civic association, luncheon clubs, and church bodies. The devices used are about the same as those suggested above: free and open discussions with ample opportunity for pertinent questions; studies of the literature available, reports of visits to other schools, and from the teachers and pupils of those schools; and a discussion of the local possibilities. The principal and faculty must accept responsibility for this program of education.

Begin with Short and Simple Trips.—While it is highly desirable that all trips should be relatively successful from both the pupils' and the teachers' points of view, those trips that are promoted first should be especially so, because of the attitudes which will be immediately taken toward them by pupils, teachers, and parents. The successful planning and conducting of a trip are dependent on the successful planning and handling of the many and varied details which go to compose it. If the teachers have had only limited experience with these events it is reasonable that they should promote only shorter, smaller, and simpler trips in the beginning. This policy will not only give them plenty of opportunity in which to master the details involved, but it will also guarantee that any failures will be relatively insignificant.

Make a Survey of the Local Trip Possibilities.—It is logical that a class should initiate its program of trips by arranging for visits to objectives in the immediate community. Such trips are not only vital because they concern things close to the pupils, but they are also inexpensive in time and money, and are relatively easy to arrange and handle. Suggestions of objectives may be obtained from the pupils, teachers, and parents. If this survey is made as complete as possible the first time it will make later surveys unnecessary, and will also result in a longer and more varied list of possibilities from which to select. Incidentally, such a survey in any community, small as well as large, will always result in a surprising array of possibilities.[1] All should be included in the list, even those obviously dangerous, inaccessible, or for other reasons questionable. The listing and later evaluation of these as potential objectives will be valuable to the group, and further, it is entirely possible that some of these questionable objectives may be made quite suitable through proper precautions and arrangements. If a general policy of trips is being formulated in the school, representatives from the various classes may be selected to form a central committee so that wasteful duplication does not result.

After the objectives have been decided upon, either at once or preferably just before each trip is made, it will be necessary to collect pertinent information concerning the objective, as, for instance, the name or designation; address or location; the educational values it may offer; the age and grade levels and subjects to which it is best suited; the methods, routes, and cost of transportation; the time most appropriate for visitation; the amount of time probably necessary for the trip; the size of the group which can be accommodated; the name of the individual with whom arrangements should be made; and suggestions as to materials and methods to be used in preparation. McCallum points out that remarks, suggestions, and warnings should also be included in this analysis and that even such comments as "Let the children see the monkey last or you won't see anything else" or "Don't wear your good shoes when you visit the zoo" will be valuable. When making arrangements for a trip it is reasonable to request these suggestions from those who are competent to offer helpful hints.

Establish and Maintain Cordial Relations with Those in Charge of the Objectives.—When the teachers and pupils visit some objective they should be made to feel most welcome to it. If their reception is perfunctory rather than cordial they will feel as if they are being merely tolerated as more or less unwelcome guests and their enthusiasm will be considerably chilled. On the other hand if they are made to feel that they are most welcome, that they are guests of honor, and that the proprietor and officials are really delighted to have the opportunity of showing them around, their resultant attitude is certain to be conducive to complete enjoyment and enhanced learning. The establishment of cordial relations is too important to be left to mere chance; provision for it must be very definitely made.

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[1] In Chap. II, Environment as a Primary Source of Materials of Instruction, "Eighth Yearbook," Department of Supervisors and Directors of Instruction, 1935, will be found an almost unbelievable array of possible trip objectives, together with descriptions of many trips actually taken.

FIG. 61.—Watching an operatic star (Helen Jepson) make up. These are some of the 3,500 junior and senior high school pupils who witnessed Gounod's "Faust," the first of three special Friday matinee Junior Performances staged (1939–1940) by the Metropolitan Opera Guild. Pupils from 70 New Jersey schools made the trip in a merry convoy of 87 buses. (*Courtesy of Newsweek and Pat Terry.*)

The trip idea is probably newer to the proprietors and officials than it is even to the teachers and pupils, and because of a lack of knowledge and appreciation they need not be expected to consider it much more than a high class sight-seeing expedition. Often, too, they may even consider it an interruption, a sort of imposition that must be patiently borne. In order to prevent or to change any such feeling, the school authorities must develop a wholesome and cooperative attitude by educating these proprietors and officials in the ideals, purposes, procedures, and later utilization of this device.

If these trips are just being initiated it is as logical that the first steps in the development of friendly relations should be made by the head of the school as it is that they should be made by the head of the objective, or with the proper official, in case there is one. To illustrate: at the outset it is no more reasonable that these arrangements should be made by a teacher of the school than it is that they should be made by a bookkeeper, teller, or lesser official or employee at the other end. Having the heads of both school and objective make the arrangement will give added importance and dignity to the event. Later, as suggested below, when the trips have become established and appreciated as a regular school policy, it may be quite appropriate for the teachers and even pupil committees to make the necessary arrangements.

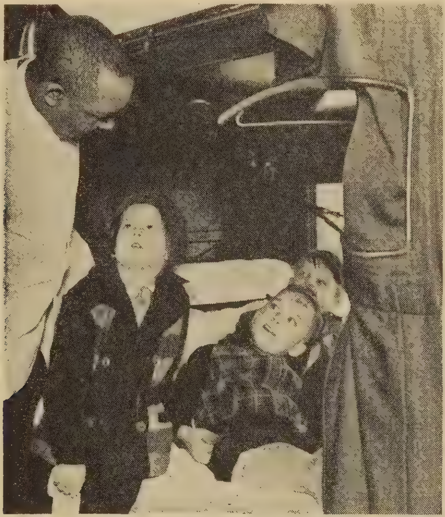

FIG. 62.—As a part of a trip to a train these pupils are being literally "put to bed." (*Courtesy of Springfield, Missouri, Public Schools.*)

Usually, if not always, the first work in building this foundation should be done through a personal interview. Correspondence is too formal and too limited in its possibilities of give-and-take, and telephone conversation is too informal and casual to be important. Later, these means may be utilized in arranging details, but they are hardly satisfactory in making the first, and the most important, contact.

If a definite and permanent policy of school trips is planned, it will be necessary to schedule later visits by other groups, and hence it is desirable not only to establish but also to maintain cordial relations. Any visit which cannot be considered by the cooperator as successful from his point of view, that is, which does not leave him with a sense of satisfaction, will handicap later visits. A courteous consideration of the cooperator's time, a careful observance of rules, regulations, and customs, interested attention to explanations and descriptions, gentlemanly and ladylike behavior, and a sincere expression of appreciation at the conclusion of the visit, will help to maintain cordial relations and so pave the way for later visits. Pupils who will not cooperate in these matters should not be taken on the trip; they represent liabilities and not assets.

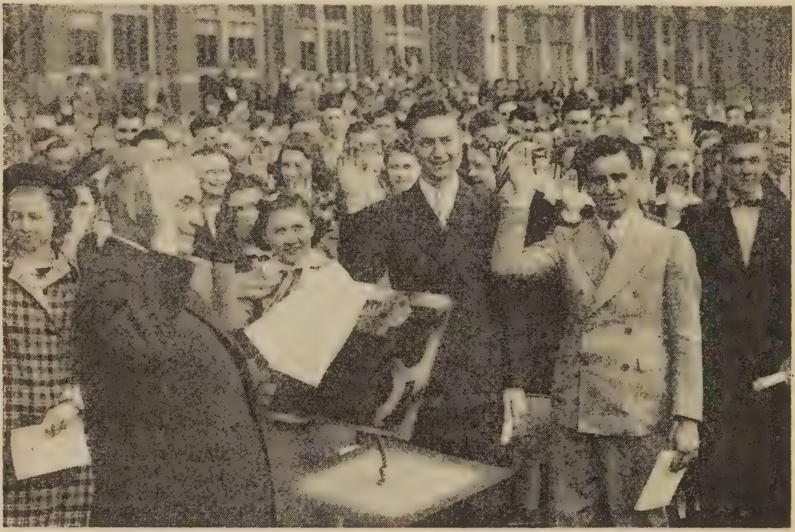

FIG. 63.—The end of one trip, the beginning of another. Climaxing a course in municipal government these voters-to-be of Manitowoc, Wisconsin, marched in a colorful parade to the presence of Chief Justice Marvin B. Rosenberry of the State Supreme Court and took the oath of allegiance.

Plan All Details of the Trip Carefully and Completely.—Definitely, wisely, and completely thinking through and arranging the details of the trip—objectives, purposes, permissions from and arrangements with the cooperator, time, expense, routes, methods of transportation, equipment, safety, comfort, courtesy, preparation, organization, supervision, guides or instructors, expression of appreciation, and final capitalization—help greatly towards guaranteeing its success. In fact, the trip should be completely made in the imagination of the teacher or committee before the group steps out of the building. Not only should the plans be made, but, in general, they should be closely followed, if for no other reason than that if they are not followed the pupils will not invest much time or attention in making them for the next trip. Unforeseen and unexpected happenings will probably occur even in the most carefully planned event and the necessary readjustments will have to be made; but in any case, the more complete the planning, the fewer of these upsets there will be.[1] The part the pupils may play in arranging these details has already been suggested in the fourth purpose on pages 188–189.

Make Appropriate Class or Group Preparation for the Trip.—Because nearly all trips are made in connection with some class exercise, material, or project, they should develop naturally out of the class setting. The trip assignment is really but one form of the lesson assignment, and as such it must be based on good principles. A trip assignment of the "tomorrow-we-are-going-to-visit-the-post-office" type is no more helpful or justifiable than one of the "for-tomorrow-take-ten-more-problems" type. A good lesson assignment not only indicates and locates the materials to be covered, but also stresses the importance of the next lesson, raises thought-provoking questions and challenges, warns of possible dangers and difficulties, and brings the pupil into contact with other materials which arouse his curiosity. Similarly with the trip. A good trip assignment not only indicates the objective and its location but also stimulates the pupil to think about it in terms of its importance, purposes, practices, and personnel. The pupil attempts to visualize it and so builds an atmosphere of anticipation. As has been, and as will be, repeatedly emphasized in this book, merely looking at some object is neither so interesting nor so profitable as going to see the whats, wheres, whys, whens, and hows relating to it. Further, the wise teacher will purposely bring the pupils into contact with other items or things which will arouse their curiosity and so plant the seeds for additional trips.

This class or group preparation may be developed through the use of appropriate questions, references, reports, stories, clippings, pictures, illustrations, slides, films, and other materials. Too, the teacher will incite and guide discriminating discussions of the purposes, practices, materials, personnel, and other elements of the objective. Children as well as adults are always interested in other individuals and their activities, and if the objective employs a number of people, questions concerning these, their sex, age, dress, activities, general habits or manners, recreations, pay, and other personal matters and relationships may be raised. Because the purpose of this preparation is to prepare and not to fulfill, many of these items will represent questions and not answers. Probably in very few cases need there be any fear of overpreparing the group for a trip.[1]

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[1] An excellent article to read in this connection is A. K. Lobeck, The Organization of Field Excursions, "Thirteenth Yearbook," pp. 274–277, Department of Elementary School Principals, 1934.

Supervise the Trip Most Carefully.—The trip should be supervised most carefully in order to protect both the pupil and the school. The group on a trip represents the school before the world—it is in public and everyone in the vicinity is watching it and, consequently, any boisterousness, carelessness, accident, or other unpleasantness will immediately cause adverse publicity and bring an unfavorable reaction to the school and its trips which will seriously limit the development and utilization of this aid. These undesirable possibilities can be prevented only by a proper education of the participants before the trip, and a close supervision of them during it. Usually, with the average-sized and larger groups, it is desirable that more than one teacher, or several carefully selected and trained older pupils, accompany it. Requiring a signed permission from the parent is another method of insuring protection. Some schools make use of a printed or mimeographed form for this purpose on which the date, objective, time, and an explanation of the respective responsibilities of the parents and school are set forth. This is an excellent device, but it cannot take the place of vigilant and competent supervision.

Correlate and Integrate the Trip with Class Activities.—Although it is possible to make profitable trips that are not related directly to curricular subjects, our interest here is in the utilization of this device as an aid to formal instruction. Hence we are interested in the trips which grow directly out of school subjects or which can be closely related to and definitely coordinated with them. The opportunities for this correlation and integration are numerous, varied, and easy to capitalize, and increasingly they are being capitalized.

Three great American educators, that is, enthusiasts for three very vigorous current educational movements, have literally jumped to capitalize the school-trip idea. These are the "audio-visual instructor," the "practical educator," and the "integrator." The first, as we have already seen, is enthusiastic about school trips because he recognizes how they can interpret, enrich, and supplement traditional school material, thus making it more vivid, intriguing, and meaningful. The practical educator supports the school trip because he recognizes that it gives the pupils useful experience with real life settings, conditions, situations, materials, processes, and personnel. The integrator believes in breaking down the artificial lines of formal subject matter and correlating all the school's interests, subjects, activities, materials, and methods, and he promotes the trip because it does just this; it represents settings in which written and oral composition, reading, arithmetic, spelling, geography, civics, history, art, music, commerce, citizenship, courtesy, etc., are intermingled functionally as they are in real life instead of being, as they are in the average school, separated into different "subjects" or "slices" of life.

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[1] The preparation for the annual tours of the Haw Creek Township High School (see footnote on p. 192) begins early in the fall and continues throughout the school year. Each student is given an attractively bound book of some 150–200 pages of mimeographed outlines, maps, songs, descriptions, explanations, questions, projects, references, assignments, etc. No student is allowed to go on a tour until he has completed his trip book and had it officially accepted. Then the book is returned to him for further filling in after the various objectives have been visited. Naturally, all or nearly all school subjects are directly reflected. An early fall public program consisting of exhibits, slides, films, pictures, talks, etc., is presented by the students who made the tour. The students retain their trip books.

It is not practicable, owing to the many possibilities and to the limitations of space, to describe all the numerous and varied potentialities of trip correlation and integration, but it is possible to illustrate a few general types. Some are: using oral composition—talks, explanations, descriptions, demonstrations, and dramatizations—both in class or group and in assembly, PTA, and other public meetings in preparing for and in reporting on the trip; utilizing written composition in preparing papers, notebooks, scrapbooks, newspaper reports, and in letters of thanks and appreciation to the cooperators; building replicas of stores, banks, buildings, bridges, farms, memorials, and machines; developing exhibits of appropriate materials in connection with any subject or activity; being stimulated and inspired to creative self-expression in literature, art, music, handwork, and drawing; obtaining useful, helpful, and enriching information and knowledge in connection with all subjects; developing a broadened and improved taste for literature, music, .art, and motion pictures; practicing conversation, safety, good citizenship, cooperation, and courtesy; realizing the parts played by skilled and unskilled labor and the implications; and appreciating the importance of the interrelationships of all of man's activities. Certainly there is no reason why any teacher should ever complain about a lack of possibilities for a vital integration of school trips with school subjects and activities.[1]

Further, these trips may result in definite school and class projects which can be used directly later by other groups and indirectly as examples of profitable educational procedures. For instance, demands for such projects as an aquarium, vegetable and flower gardens, school museum or library, lawn beautification, window gardening, bulletin boards and materials, exhibits of toys, pets, curios, flowers, plants, photographs, etc., and other types of projects come very naturally out of experience with these and similar items in their out-of-school settings.[1] Recommendations to the proper authorities on matters of traffic, drinking fountains, recreational facilities, welfare projects, and the like may grow easily out of investigational trips.[2]

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[1] The majority of the references of this chapter include descriptions of actual practice in these correlative and integrative processes.

Make and File a Fair Evaluation of Each Trip.—If an educational device or opportunity is to be capitalized successfully the individual who does the capitalizing must have (1) a clear idea of the purposes and values involved; (2) competency in handling or utilizing the device or opportunity; and (3) a set of standards by which he can rate his results. If he has only the first two, or if he has, but does not use, the third, he can have no knowledge of the extent to which he accomplished the purpose and hence he can not know which parts were strong and which were weak. Similarly with the school trip. The teacher must have (1) a clear idea of purposes and values; (2) competency in planning and executing the trip; and (3) a plan by which she can estimate its success in achieving the purposes set.

Such an evaluation is difficult because many of these evidences are not immediately visible, yet it must be made. Further, it must be made fairly, and not solely on the basis of the pupil's interest, or even on the teacher's for that matter. The pupils might receive a great thrill in watching the powerhouse machinery operate, the printing press turn out newspapers, or in just walking through a beautiful building, and still not receive educational value commensurate with the time spent. Interest is very important but the appraisal of the trip must also be on the basis of its success in establishing the more fundamental ideas, ideals, information, and inspiration. The teacher may gather evidence from such sources as these: her own opinions; pupils' expressions; comments and remarks both during and following the trip; similar comments which come indirectly through other pupils, teachers, and parents; written pupil evaluations; requested written reports; and the records of correlated class or activity work. These appraisals are subjective in nature and may be somewhat biased and inaccurate, but they are evaluations which taken together will give some idea of the extent to which the trip may be considered a success.

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[1] See B. Elliott, Excursions in Appreciation in the Small Town School, "Thirteenth Yearbook," pp. 284–288, Department of Elementary School Principals, 1934, for an account of the trips taken by a four-teacher school, and the interesting projects which grew out of them.

[2] The grade 9*A* class of the Mack School, Ann Arbor, Mich., following apparently useless PTA protests against the failure of traffic to observe the signs at the intersection by the school, checked traffic for three days and sent its report to the city council through the executive committee of the PTA, with the result that the state highway was rerouted from this particular point.

Evaluating the various details of the trip will be a relatively easy task because of the definiteness of the items concerned. This evaluation may be made on a printed or mimeographed form, which, when completed, is filed away for reference when another trip to this or similar objective is being considered. Such questions as the following are pertinent:

1. Was the time sufficient for the trip? If too long, how much?
2. Was the group of about the proper size? If too large, how much?
3. Was the transportation, or the route taken, satisfactory?
4. Was the individual or group expense about right?
5. Did the group see what it went to see? If not, specify.
6. Did the group see enough so that what it saw was worth while?
7. In general, was the group interested and attentive?
8. Were any pupils disappointed with the trip? Specify.
9. Were there any avoidable delays or waste of time? Specify.
10. Was the guide satisfactory? If not, specify his weaknesses.
11. Was the general conduct of the group satisfactory?
12. Was the trip correlated satisfactorily later? Specify.
13. What were the most satisfactory things about the trip?
14. What were the most unsatisfactory things about the trip?
15. If you were repeating the trip what changes would you make?

It is entirely possible that sometimes the unsatisfactory things about the trip, such as an avoidable delay, or an unsuitable guide, are due to the cooperator and not to the teacher and her group. In such instances the difficulties should be smoothed out before another trip is taken to this objective. The average cooperator, especially if he favors these trips, would be glad to make any changes that would result in a more successful event. It is the duty of the school to insure that the event is unhandicapped in the same way that it is its duty to insure adequate heating and lighting of the classroom or appropriate textbooks and materials.

OBJECTIVES OF SCHOOL TRIPS

In every community, large or small, there are places of interest to which the pupils may profitably make trips, and nearly all of these may be visited and revisited year after year. Usually, too, there are places which are not open to visitors, some to which it is not advisable to take groups of pupils, and some which are hardly worth visiting. But even when these are eliminated there will be plenty of logical and valuable trip objectives remaining. The following list will suggest some of these.

Agriculture: farms—grain, stock, fruit, tobacco, cotton, dairy, school, experiment, irrigated, dry; processing plants—packing, ginning, stemming, milling, pickling, canning, condensing; stockyards, elevators, warehouses, and storage plants.

Art: galleries and exhibits; architecture; churches, homes and furnishings—rugs, wallpaper, pictures, and statues; cemetery; public works; landscapes and seascapes.

Clothing: factories; stores; cleaning, dyeing, and pressing establishments; laundry.

Clubs: fraternal, professional, and social; Y. M. C. A., Y. W. C. A., Y. M. H. A.; commercial, country.

Communication: telephone and telegraph—offices, exchanges, lines, plants; radio broadcasting station and studio.

Community groups: religious, racial, national, artistic, occupational.

Courts: justice of the peace, magistrate's, city, traffic, police, juvenile, county, circuit, supreme.

Educational: schools—public, private, and parochial, night, adult, open-air, military, nursery; higher institutions—college, university, technical school, business college; museum, gallery, library, theater, exhibits, meetings.

Engineering: bridge; highway; tunnel; viaduct; aqueduct; canal; garbage disposal plant; buildings; drainage and sewer systems; flood and erosion control; hydroelectric plant, dam, pumping station, power house; improvements.

Expositions, fairs, and exhibits of all kinds.

Factories: automobile, building-supply, machinery, clothing, glass, ceramic, soap, tools, implements, weapons, furniture.

Federal: post office, court, lock, dam, mint, power plant, flood- and erosion-control devices, experiment stations, nature preserves, improvement projects.

Financial: bank, clearinghouse, broker's office, stock exchange.

Food and drink plants: bottling, ice cream, breakfast food, dairy products, ice, canning, packing, pickling, baking.

Health: center, clinic, sanitarium, hospital; first-aid station; safety-first provision in streets, homes, offices, factories; fire and disease prevention.

Historical: buildings, homes, settings, sites, shrines, memorials, markers, monuments; battlefields, cemeteries and burial plots; old forts; expositions; exhibits—documents, weapons, utensils, clothing and costumes, relics, old-village, pioneer-home, and furnishings.

Homes; slum, middle-class, and exclusive-district; buildings—exterior and interior; furnishings, equipment, appliances, and grounds.

Hotels: flophouse, middle-class, and exclusive; apartment and resort; restaurant.

Literary: library; exhibits; bookstore, publishing houses; authors' homes and haunts; graves, shrines; story settings and inspiration spots; dramatic events and activities; newspaper and magazine offices and plants.

Meetings: board of education, city council, court, legislature, political rally, conferences, forum, debate, lecture, address, symposium, program.

Military: fort, reservation, armory, post, airfield, school.

Mines and quarries: coal, zinc, lead, gold, stone, gravel, granite; processing plants.

Municipal: departments, offices, plants; services—police, fire, welfare, safety, health, streets, water, jail, courts, garbage and sewage disposal; utilities—water, gas, heat, power, light.

Music: concerts, opera, studio programs; composers' homes and graves; inspirational settings; exhibits; publishing and recording companies; manuscript rooms; school, conservatory; instrument manufacturing plant; stores.

Nature: water and land forms—river, pond, lake, waterfall, island, hills, mountains, valleys, cave; geological formations; woods and fields; nature and forest preserves; bird and animal sanctuaries; public and private parks, arboretums, plantarium, floral and vegetable gardens, greenhouses, and nurseries; botanical and zoological gardens; scenic spots, phenomena, and curiosities.

Naval: station, ships, air station, airplanes, docks, yard, school.

Oil: wells, refining and processing plants, station, pipe lines, tank cars, tanker, filling station.

Penal institutions: workhouse, detention home, industrial school, jail, penal farm, penitentiary.

Professional: offices of physician, dentist, lawyer, minister, banker, publisher, weather forecaster, insurance salesman, real-estate agent.

Public works: buildings, aqueduct, viaduct, bridges, streets, tunnel, waterworks, flood-control and other protective projects.

Recreational: swimming pools, beaches, playground, parks, courts, courses, camps, stadium, gymnasium, skating rinks.

Religious: cathedral, churches, synagogue, missions, schools, camps.

Shops: machine, blacksmith, plumbing, carpenter, printing, barber, beauty.

State: institutions, buildings, preserves, sanctuaries, services, organizations.

Stores: Wholesale and retail; department, general, jewelry, grocery, street market, book, meat market, bakery, fuel yard, secondhand, five-and-ten, "chain."

Transportation: land—railway, surface, elevated, and subway lines; bus lines; trucking corporations; terminals, offices, equipment, repair ships, freight and express services; automobiles and trailers, parking stations, camps, highways. Water—ships and boats, ferry, docks, canal, dam, lock, ford, bridges. Air—airport, hangars, airplanes, offices, shops, air events, races and shows, museum exhibits.

Utilities: municipal and private; water, heat, power, light, gas.

Welfare: settlement house, community center, agencies and institutions.

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CHAPTER X

AUDITORY AIDS

After they were invented, but before they became known as auditory or sound aids, the radio, phonograph, and sound-amplification and centralized sound-distribution systems were, like the stereograph and the motion picture, developed for entertainment purposes or for practical utilization in industry. However, it was not long until educators, encouraged by the various movements to enliven and vitalize education and assisted by the manufacturers of these devices, perceived their possibilities and began to utilize them for formal instructional purposes with the result that during the past few years a great deal of school money and time has been invested in them. Although they have become well established in educational affairs, they promise still greater development as refinements, improvements, and adaptations are made and as teachers and administrators, through experimentation and use, become more skillful in utilizing them. The purpose of this chapter is to describe these devices and to show some of the ways in which they can be profitably capitalized in the schools.

RADIO

There is little need to dwell on the phenomenal development that has been made in radio during the past fifteen or twenty years; a mere mention will suffice to indicate it. Two decades ago radio was in its infancy—its crystal-set stage—and was largely a sort of scientific novelty with which one could amuse and mystify his uninitiated friends. Now it is solidly established, not merely as a convenience but as an actual necessity, in nearly all phases of man's modern life—industrial, professional, political, educational, and recreational. Hundreds of stations now broadcast thousands of programs through millions of receiving sets to hundreds of millions of listeners.[1] By annihilating space it allows the listener to participate in activities in all parts of the world.

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[1] The Joint Committee on Radio Research reported, Jan. 1, 1938, that 84 per cent of all the homes in the United States have radios—27,000,000 families owning 33,000,000 radio sets. The Columbia Broadcasting Company stated in its publication, "Radio in 1937," that there are, in the United States, over 95,000,000 "family hours" of radio listening each day. The National Visual Education Directory listed (1936) 11,501 school-owned receiving sets and 841 centralized

Proof of the influence of radio was never more strikingly demonstrated than recently, when, as the result of the realistic broadcasting of an utterly fantastic story of an attack on the earth by monsters from Mars, hundreds of people according to the newspapers (and perhaps press agents) rushed into the streets, made frantic calls to broadcasting stations, newspaper offices, police stations, and government offices; many volunteered their services for first-aid purposes, and a few even committed suicide.[1] Other proofs of the power of the radio are to be found in the wide use made of it by dictators through government-controlled stations in foreign countries, and in the extent to which it is used in this country in all types of commercial, political, and educational endeavor.[2]

Radio reflections are powerful because they are firsthand, authentic, and immediate. The listener is really present, he "sits in" at the inauguration of a president or the coronation or resignation of a king, at the opening of a congressional session, at a hockey game or boxing match, at an opera, symphony concert, pageant, or play, at important meetings or conferences, or at a battle or disaster. These experiences are thrillingly vivid because they are real, far more real than they could ever be if they were gained from the reading of subsequent newspaper accounts of the events reflected. Even re-creations, such as those presented in the "Interviews with the Past" series of programs of the United States Office of Education, are strikingly realistic.

Radio and the School.—Because of its quite apparent success in profoundly influencing millions of adults, educators began to ponder the educational potentialities of radio, and, especially within the past five or seven years, have very deliberately and definitely taken steps to capitalize it. Much has been done in studying and analyzing its possi-

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radio-sound systems. Dent, in a letter to the writers, estimates that "at present (May 27, 1940) there are undoubtedly four or five times as many equipments in use among schools."

[1] Probably the newspaper reports of the effects of this broadcast were a bit exaggerated. However, it is true that the program did cause considerable excitement and "made" front pages all over the country.

[2] The School of Public Affairs of Princeton University, with the aid of a grant from the Rockefeller Foundation, has for two years been making a comprehensive investigation of the influence of radio on present-day life. The report of this study will appear under the title "Radio and the Printed Word." A very interesting account of some of the significant conclusions from this nation-wide survey will be found in Edwin Muller's, Radio versus Reading, *The New Republic*, Feb. 19, 1940.

bilities, in developing and experimenting with materials and methods,[1] and in centering the attention and mobilizing the interest of teachers and administrators on the many and varied potentialities of this new instructional device.

To illustrate briefly: The Cleveland School of the Air makes radio an important and integral part of school activity. Its programs, which are actually tried out in two school settings before being broadcast, include practically every subject and illustrate all types of classroom procedure.[2] The Rochester, New York, School of the Air

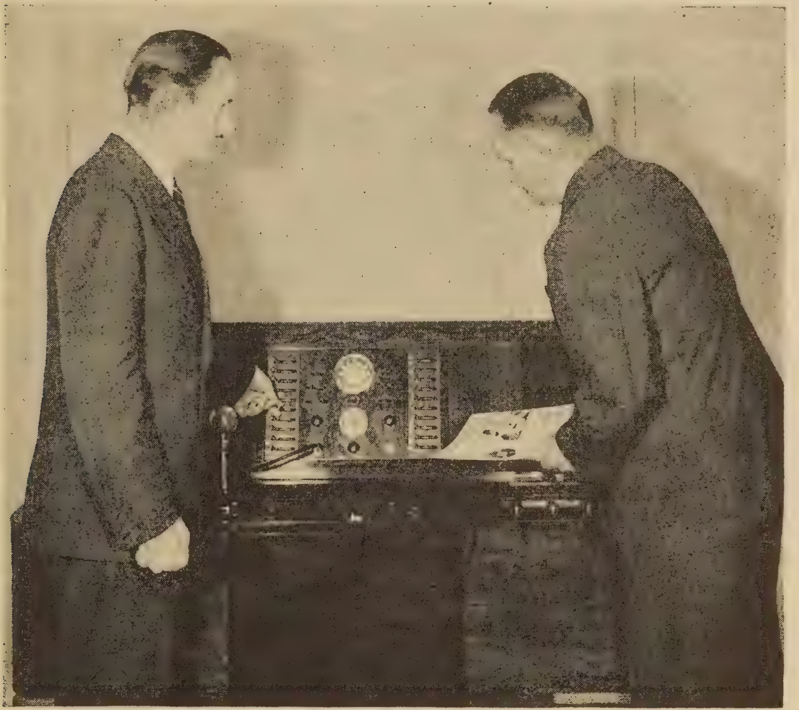

FIG. 64.—Standard equipment in the modern school is the sound system which is used for the distribution of speech, radio, and record programs. This equipment varies in size and capacity from a simple table or portable type to the de luxe system shown here. (*Courtesy of RCA Manufacturing Company, Inc.*)

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[1] Some of these experimental studies are summarized in E. Laine, "Motion Pictures and Radio," The Regent's Inquiry, McGraw-Hill Book Company, Inc., New York, pp. 105-109, 1938. See also C. Atkinson, "Development of Radio-education Policies in American Public-school Systems," Edinboro Educational Press, Edinboro, Pa., 1939.

[2] See BUCKLEY, H. M., W. L. CONNOR, and G. C. HAWKINS, Radio Instruction

correlates its programs with regular schoolwork and also coordinates the educational activities of three community institutions, the Civic Music Association, the Public Library, and the Museum of Arts and Sciences. These programs are listened to regularly by 46 city schools and 125 schools outside of Rochester. In Detroit, at the time of an important broadcast, everything in the schools stops, and the program is listened to by everyone. Atlanta; Indianapolis; Akron, Ohio; Alameda, California; Grand Forks, North Dakota; and Lawrence, Kansas, are a few of the other cities in which school radio departments have been developed. The Damrosch Music-appreciation Hour of the National Broadcasting Company, and the American School of the Air (now in its eleventh year) of the Columbia Broadcasting System, are especially designed for school use, as are also the "The World Is Yours," "Have You Heard?," "Democracy in Action," "Education in the News," and "Let Freedom Ring," series of the United States Office of Education. Other well-known educational broadcast promoters are the Ohio School of the Air, North Carolina Radio School, Wisconsin School of the Air, Texas School of the Air, The Standard School Broadcast (Pacific coast), and Chicago Public-schools Broadcast. Several of the private and state universities and state departments of education also schedule and broadcast material designed for use in the schools.[1]

The following weekly schedule of the spring semester, 1939, of the American School of the Air (co-sponsored by The National Education Association) gives a general picture of the subjects and activities covered.[2]

Monday:	Frontiers of Democracy (upper grades, high schools).
Tuesday:	Music and the Friendly Arts (high schools).
Wednesday:	New Horizons, Geography and Science (elementary, high schools).

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in Cleveland, "Thirteenth Yearbook," pp. 394–406, Department of Elementary School Principals, 1934; also the footnote on p. 228.

[1] According to *The New York Sun*, British boys and girls now (1940) evacuated from the target areas in the big cities are receiving instruction, during "air-wave hours," from specialists employed by an educational council of the British Broadcasting Company.

[2] These programs, now being broadcast over 105 stations, are listened to regularly by 5,000,000 school children in some 200,000 classrooms in America. They have been officially adopted as part of the regular school curriculum of six states: Illinois, Louisiana, New Mexico, Texas, Utah, and West Virginia. The American School of the Air is now (1940) being extended to the whole of the western hemisphere, material being drawn from all of the cooperating countries. Where necessary the scripts will, of course, be translated for local broadcasting.

Thursday: This Living World (upper grades, high schools).
Friday: Tales from Far and Near (elementary grades).

Naturally, as in any pioneering project, this new field offers many unsolved problems, a few of which are: How can programs be properly correlated and integrated[1] since, generally speaking, both school and broadcasting schedules are inflexible? To what extent will uniformity of instruction—the same material, the same method, and the same time—tend to cause undesirable regimentation? Should the school stop its regular work for the broadcast of a great event or of a prominent individual? To what extent are commercially sponsored programs desirable? How can adequate equipment be provided for the schools?[2] To what extent are transcriptions satisfactory substitutes for actual broadcasts? In what ways can the subject matter of programs be improved? In what ways can pupil activity be encouraged and capitalized? How can teachers be trained to utilize the radio efficiently?

As yet we cannot answer these questions or solve the problems that they suggest. However, judging by the extent to which educational organizations, committees, federal and state departments and bureaus, and individual teachers and administrators, as well as commercial and noncommercial broadcasting companies, are working on these problems, great and rapid progress can be expected in this field during the next few years. The purpose of this section of the book is to indicate and justify some of the ways in which radio can be profitably utilized in instructional activities.[3]

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[1] In Integrating Radio Programs with School Schedules, "Thirteenth Yearbook," Department of Elementary School Principals, 1934, Julia M. McCarthy describes how this is done at the Marcy Intermediate School, Detroit.

[2] Some schools without electricity are now using the battery and windcharger or air-motor device. "Auditory Aids in the Classroom," published by the Committee on Scientific Aids to Learning, 41 West 42d Street, New York City, gives comparative costs, in detail, of four methods of providing auditory aids—commercial broadcasts, school-owned station broadcasts, wire lines, and records. "Broadcast Receivers and Phonographs for Classroom Use," published, 1939, by this committee is a comprehensive and detailed discussion of the factors that should be considered in the selection of these two types of equipment. See also Chap. VI, Radio Receiving Equipment for the School, in M. Harrison, "Radio in the Classroom," Prentice-Hall, Inc., New York, 1937. Incidentally, this book of objectives, principles, and practices is probably the most practical volume published on the subject. It should be available to any teacher who utilizes radio programs in her work.

[3] Five good practical references are: I. K. Tyler, Radio's Function in Education, and N. Woelfel, Educational Opportunity on the Airways, in *Educational Method*, vol. 18, pp. 147–154, 155–160, January, 1939; G. M. Banker, Planning for Efficient

OBJECTIVES OF RADIO INSTRUCTION

There are many purposes, both general and specific, that can be set as justifiable objectives of the pupil's experiences with radio programs, and an adequate discussion of these would require many more pages than are available here. Consequently, only three will be presented. The first of these concerns very directly the utilization of radio as an important audio aid, and the two others, while closely related, are a bit broader in general characteristics and implications.

To Interpret and Enrich Classroom Work.—This purpose is not peculiar to radio instruction only; it is common to all the instructional aids discussed in this book, and therefore it need not be discussed at length in this connection. Radio instruction is not a substitute for teacher instruction, nor will it ever become one, as some skeptical educators claim to believe. Rather it is a means of supplementing, vitalizing, correlating, and often modernizing and decrystallizing the material of the textbook. Specially designed programs of high instructional value are broadcast by regional and national networks, commercialized, noncommercialized, and strictly educational. In order to make for a more complete and profitable use of these programs, quite a number of the stations and sources supply inexpensive teachers' manuals and guides, suggestions, annotated bibliographies, printed transcripts and summaries, and other materials. A few examples will illustrate how the radio program can and actually does function. Not all the program series indicated are available during school hours but, as will be suggested later, all of them can be used in connection with school work.

English.[1] *Literature.*—The reading, speaking, commenting, reviewing, and dramatizing of poems, addresses, plays, pertinent news, and other literary material by well-known authors, critics, poets, playwrights, casts, and interviewers, few of whom the pupil will ever actually see, bring an emotional thrill that is rarely caused by the textbook. Illustrative of this type of program are "Great Plays," Orson Welles's remarkable "Dramatic Workshop," "Shakespearean Drama," and the "Pilgrimage in Poetry" series of the National Broadcasting Company; "Poet's Gold," "Between the Book Ends," "Shakespearean Cycle," and "Workshop Plays," of the Columbia Broadcasting

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Use of the Radio, C. M. Koon, Should I Bring Radio Into My School? and F. H. Lumley, Suitable Radio Programs for Schools, in "Thirteenth Yearbook," pp. 380–382, 383–387, 407–417, Department of Elementary School Principals, 1934.

[1] See Reid, S., Radio and English Objectives, *Educational Method*, vol. 18, pp. 180–184, January, 1939.

System; and "Great Short Stories" of the Mutual Broadcasting System.

Composition.—A radio program is made up of both written and oral composition. Good diction, well-chosen vocabulary, clear and concise statement, and appropriate illustration are essentials of any high-class written composition. Correct pitch, quality, rate, force, modulation, phrasing, and inflection are essentials of pleasing oral composition. Both of these types of composition are represented in every attractive radio program, and both can be better understood and appreciated by the pupil through the actual illustrations that the radio offers.

Further, through the use of the radio the pupil can be taught production as well as consumption. He can be led to write and present all types of radio material for real or simulated broadcasts—notes, announcements, comments, stories, reviews, poems, news reports, correspondence, interviews, and simple plays. These opportunities for pupil activity are limited in number and variety only by the range of the interests and abilities of the group. The pupils can also be encouraged to write reviews, criticisms, reports of actual programs, letters to stations and broadcasters, and to make classified scrapbooks of material.

Social Science.—Radio programs reflect, by news summaries, reports, comments, interpretations, explanations, descriptions, correspondence, and interviews, all types of social-science settings, ancient and modern, national and international,—political, industrial, civic, sociological, historical, economic, and geographical. In some of these the pupil can "see" history being actually made. Through the programs the pupil, if wisely led, not only learns facts and principles, but also learns to weigh evidence, check authenticity, and to arrive at conclusions on the basis of his own thinking. One of the best of these programs was "Headlines and Bylines," composed of three 10-min. sections, each under a very competent authority—Ralph Edwards, H. V. Kaltenborn, and Gilbert Seldes.[1] Other good examples are the "University of Chicago Roundtable," "Reviewing Stand," "National Forum" (in which United States senators and representatives are interviewed), "The Farmer Takes the Mike," "The People's Platform," "America's Town Meeting of the Air" (in which both sides of controversial topics are presented), "A Trip to Our National Parks," and "The News behind the Headlines."

Music.—These programs are effective because usually, at least, they are natural, varied, and represent a high degree of musicianship.

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[1] After more than a year's run this valuable Sunday-morning program was replaced with a 15-min. news summary sandwiched between two "plugs" for a certain food corporation.

Even a transcribed program is as accurate and nearly as intriguing as an actual broadcast. The world's most celebrated orchestras, bands, stringed ensembles, choruses, glee clubs, quartettes, and operatic companies, and instrumental and vocal soloists, few of whom the average pupil will personally ever see or hear, are available at the simple turn of the dial of the magic box. All types and all qualities of music—historical, folk, religious, dance, swing, operatic, classical, sentimental—thousands of numbers, reproduced by dozens of combinations of instruments and voices, help to acquaint the pupil with the masterpieces of music and the masters of music interpretation. These can be capitalized for all types of educational purposes from pure emotional enjoyment to discriminating intellectual appreciation. Too, interesting and important facts about the lives of composers and artists, and historical, literary, geographical, and romantic settings are also represented in these programs. Examples are the well-known "Damrosch School of Music," (with 5,000,000 listeners), "American School of the Air," "The Story of Song," "Everybody's Music," "Tales from the Opera," and "The Home Symphony" (offers actual home instruction in the playing of musical instruments). Some of the

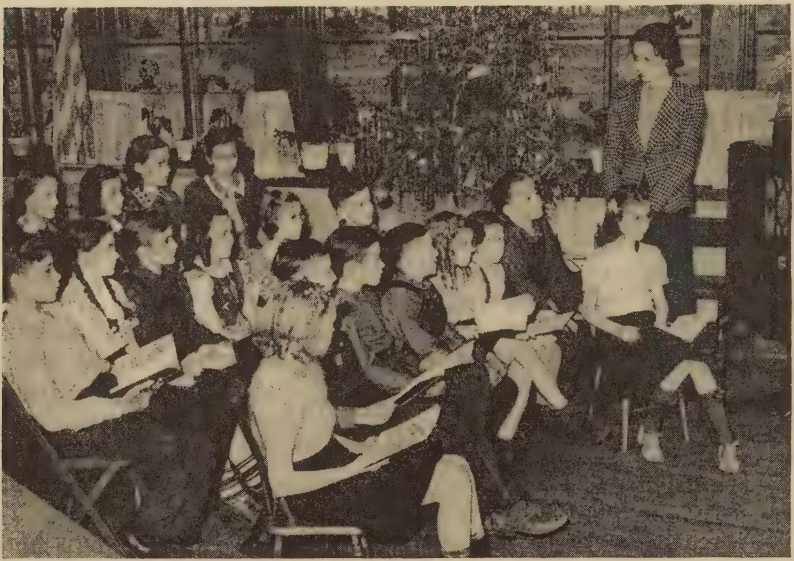

FIG. 65.—These Hazel Dell, Illinois, rural school pupils, led by the county supervisor of music via radio, are learning to sing. A synchronized program, in which 60 per cent of the schools participated, was sung on Christmas Eve, 1939. Singing is but one phase of the radio music instruction of Sangamon County. (*Courtesy of The Illinois Teacher.*)

programs especially designed for the primary grades are "Singing Around the World," "Singing Lady," "Thanksgiving Day in Song," and "Indian Songs and Legends." Further, increasingly schools are utilizing radio for actually teaching pupils to sing, as is shown in Fig. 65.

Science.—Often textbook science is somewhat behind the times because it takes several years for new discoveries, inventions, and processes to get into textbooks; radio science is up to the minute because these developments get onto the air almost immediately. Frequently, too, textbook science stops at the end of the discussion or experiment, with little or no practical application. Radio science is often more useful because it must interest, and therefore concern, the people who utilize it. Good illustrations of this type of program are "Science in the News," (nontechnical reports, descriptions, and explanations of recent scientific developments), and "The World Is Yours," (weekly half-hour dramatizations based on the exhibits of the Smithsonian Institution), "Exploring Space" (astronomy), and "Men against Death" (showing how "scientists struggle against academic stagnation and popular prejudices"). Consider for a moment how these programs can help to make science real and vital, and how they elevate it from the facts-to-be-memorized and experiments-to-be-performed type of material so often mislabeled as science.[1]

Guidance.—Formerly "Guidance" meant vocational guidance and little else. The newer and more logical conception is that any instruction that helps the pupil to make happy adjustments—intellectual, mental, physical, social, moral, and spiritual, as well as occupational—is guidance in a very real sense. Because it reflects all phases of man's living the radio can exert a great influence in these varied forms of guidance. One very attractive series of programs in general guidance is "Raising Your Parents" (Columbia Broadcasting Company). A good example of programs in occupational guidance is "Americans at Work" (Columbia Broadcasting Company). In this workers are interviewed while actually at work on the job and thus is given a real and firsthand experience with the members of the various occupational groups.

From these few examples it will be readily seen how the radio program can very naturally, appropriately, and effectively interpret and supplement much of the formal work of the classroom. But it can do more than this. Textbook lessons are usually academic and often unrelated to life and its realities. A carefully planned and attractively presented radio supplementation can make this textbook material the more practical by correlating and integrating it with real life settings, activities, and individuals. A symphony concert, an important address, a description of a revolutionary process or invention, or a news broadcast, can help to develop wholesome citizens by teaching the pupils to understand the many and varied forms of modern problems and activities and to evaluate solutions and procedures; to recognize achievements and contributions; and to comprehend international complexities. These programs help them to think more clearly and constructively on important subjects and relationships. Of course, even intelligent thinking is not the end; it must result in intelligent acting. This should eventuate all the more easily because of the stimulation of personal interest through these mental reactions.

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[1] A pertinent reference is L. M. Heil, The Use of Radio Broadcasts in Science Instruction, *Educational Method*, vol. 18, pp. 184–188, January, 1939.

To Educate for Wholesome Use of Leisure.—Man's working hours have been steadily decreasing and his hours of leisure have been just as steadily increasing. Further, the ways and means of spending this leisure time, both commercialized and noncommercialized, have multiplied enormously during the past few years and at present there appears to be no slowing down of this development. Naturally, some of these ways of spending leisure are more profitable and desirable than others. An individual cannot utilize all of the many and varied leisure devices available and so he must make choices; and the more intelligent his selections are, the more benefit he will gain from his leisure occupations. Because the school is the only institution in the community that enrolls all of the children the implication is clear—it must accept a large share of the responsibility for helping the pupil to set, or accept, and utilize standards that will insure the most profitable capitalization of his spare time. Briggs's simple definition of education, "To teach the pupil to do better the desirable things he is going to do anyway, and to reveal higher types of activity and make them desired and possible," applies as well to leisure training as it does to handwriting, spelling, reading, or any other phase of the work of the school.

One of the "things that the pupil is going to do anyway" is listen to the radio. On the basis of our present knowledge and experience, we have a right to assume that the average pupil will probably listen to the radio about as long as he lives. If this is so, then it logically follows that our duty is "To teach him to do radio better." And because this doing will be almost entirely voluntary on his part, it will be related to his interests. Every pupil has some interests, and these can be deepened by further experience through radio programs because they represent, directly and indirectly, just about everything in the whole world. Further, through radio the pupil's range of interests can be widened by experiences with things about which he knows little or nothing. In short, because of the number, variety, and quality of its representations, radio offers a most excellent device for this deepening and widening of pupil interests. Of course, this applies to his occupational, as well as to his leisure time, pursuits. Good examples of leisure-enriching programs are "Hobby Lobby" and "The World Is Yours."

To Develop Judgment and Discrimination.—This objective of radio instruction is closely related to that discussed in the previous section, but it is separated here in order to emphasize it. If, as suggested above, radio reflects directly or indirectly just about everything in the whole world, then, naturally, in content (what is presented), and in performance (how content is presented) it varies in quality from bad to good, cheap to dignified, unauthentic to authentic, and undesirable to desirable.[1] And because listening is voluntary, wise selection becomes crucial; and wise selection must be learned, it is not a trait or ability that is found in nature. If the quality of the pupil's radio consumption is to be raised, it must be raised on the basis of criteria or standards that he sincerely accepts, because his listening is voluntary.[2] These standards may be developed from evaluative discussions of real broadcasts, or of simulated broadcasts by the group or by other groups.

Content.—It is well known, as has been pointed out previously, that many radio programs contain much that is wholesome and uplifting; but it is also known that many of them contain much that should be considered downright insulting—trashy music, cheap "soap-serial" melodrama, stupid poetry, dirty jokes, insufferable wisecracking, meaningless quizzes, silly romances, intelligence-insulting advertising, testimonials, slogans, box-top and wrapper "hook-the-sucker" contests, and sales talk, fallacious reasonings, spurious conclusions, inaccurate or incomplete fact presentings, unsubstantiated and glittering generalities.[1] At the other extreme there is content that is ennobling, enriching, and often sublime, of which, says the Report of the New York Regent's Inquiry, "The lamentable aspect . . . is that no very great use is being made of the superior programs."[2] And of course content varies in worth-whileness between these extremes.

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[1] For instance, the advertiser-sponsored schedule of the Columbia Broadcasting Company for July, 1937, included the following broadcasts: four on news, one on child care, one on household advice, one on general knowledge, and sixty on light music programs, variety shows, and serial dramas. The sustaining or nonsponsored programs for the same period were much superior—four dramatic series, one public-affairs series, one education series, one children's series, as well as broadcasts of special events and addresses and many series of serious music.

In Part II, pp. 163–180, Advertising, Publicity, and Propaganda, of "Radio in the Classroom," Margaret Harrison describes some interesting classroom activities that are pertinent to this discussion.

[2] Quite different from the situation in Germany, for instance, where Hitler recently forbade his subjects to listen to Russian programs and, when this proved ineffective, developed a special division of secret police whose duty it is to snoop and arrest violators of the *verboten* proclamations. Still more recently all outside radio programs were banned.

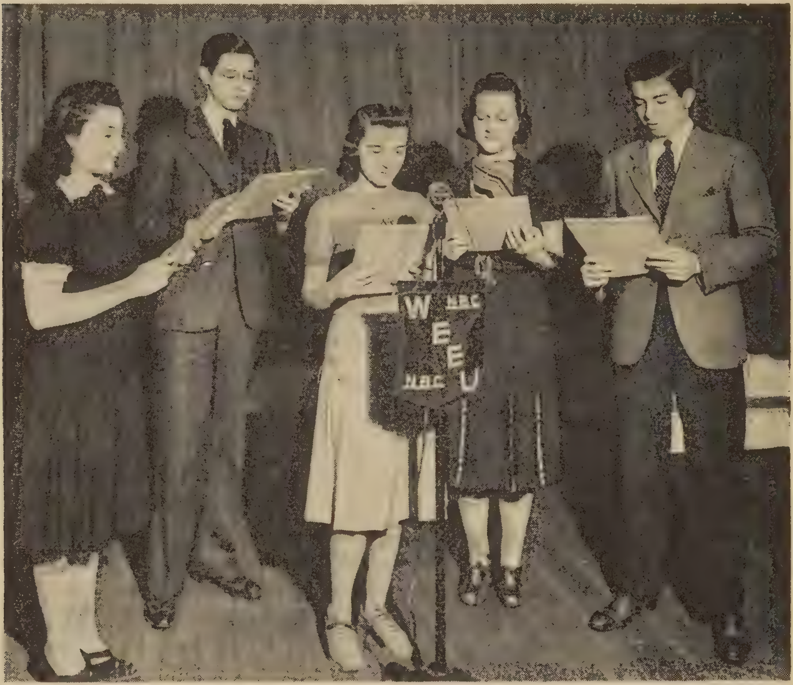

Fig. 66.—Increasingly schools are broadcasting programs of music, dramatics, literature, science, history, and school news, usually developed in connection with school subjects or activities. Here a group of Reading, Pennsylvania, Senior High School students is "on the air."

The pupil must be taught to take a critical attitude toward radio programs—to analyze and evaluate their elements, if he is to learn to distinguish truth from falsehood, fact from opinion, argument from ridicule, advertising from propaganda, logical from spurious reasoning, and useful material from trash. He must be taught to recognize innuendoes, insinuations, unreasonable prejudice and bias, and snap judgments. And he cannot do this if the teacher does it for him even though he, for policy's sake, outwardly listens to her coercive and forbidding preaching and accepts her opinions and decisions. Criteria and standards will really become his only if he himself helps to set, or at least sincerely accepts, them. Such standards may be simple, but they must be definite. Critical but fair discussions of dishonesty, misrepresentation, high pressuring, "canned applause," testimonials, and other questionable materials or procedures as well as similar discussions of the desirable elements of programs, will help to originate and develop these criteria. Writing and sending protests and favorable comments to broadcasters will help to clarify and establish them in the minds of the pupil. Broadcasters are really interested in these reactions because the success and failure of their programs depend on them. Such education will hasten the day when cheap programs are as unprofitable to the advertisers and broadcasters as they are to the listeners. Education will be more effective than censorship.[1]

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[1] A poll conducted by the Institute of Public Opinion in May, 1937, revealed that the four most popular performances were those of comedians, the fifth that of a news commentator, and the next five were of comedians. Of course this type of taste is not peculiar to radio alone; it is found also in motion-picture, newspaper, and magazine consumption.

[2] Laine, E., "Motion Pictures and Radio," pp. 83–84, McGraw-Hill Book Company, Inc., New York, 1938.

Performance.—Not only should much of the content of many radio programs be considered downright insulting, but also some of the ways in which it is presented. This is true more particularly of the commercial plugs that accompany the programs than of the presentation of the programs themselves. The pupils should study these plugs to understand and appreciate the techniques and appeals being used. The overweening confidence, highly emotionalized and fervent pleas of the "rush-right-out-to-the-store-and-buy," "now-don't-forget," and "be-sure-to-tune-in-tomorrow" type, high-pressure and rapid-fire verboseness, exaggerations, and misrepresentations, few of which would be respected or permitted in or through any other advertising medium, should be critically analyzed and evaluated in order to stiffen resistance to them. One of the wonders of the age is that the businessman, who recognizes that only honest advertising brings him really intelligent and hence permanent customers, does not recognize that by permitting such cheap methods he is aiding and abetting commercial advertising's suicide, as well as injuring, ultimately, his own business. Here again justified and justifiable student protests will help to develop criteria for radio presentation, and inoculate against and finally eliminate nauseating methods from the air. Hasten the day!

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[1] Although the Communications Act of 1934 does not permit the Federal Communications Commission to censor broadcasts, it does provide for some control through the renewal of licenses, which, as the reader probably knows, are good for only a six-month period.

SUGGESTIONS FOR UTILIZING RADIO BROADCASTS

There is no question about the potency of the radio as a teaching device; but there is a big question, in fact several of them, about the proper methods of utilizing it most effectively. An unguided hit-and-miss listening to the radio no more necessarily represents a profitable utilization of it than a similar unguided hit-and-miss looking at a picture necessarily represents a beneficial capitalization of it. Radio as an instructional aid is new. As yet we have had only limited experience with it and consequently know comparatively little about the ways and means of using it most profitably. However, out of the experimentations, investigations, and researches now being promoted all over the country by commercial and noncommercial agencies will ultimately come the techniques by which radio can be successfully utilized, and the standards by which this utilization can be fairly evaluated. Until that time we shall have to depend on our limited experience in using radio, our knowledge of what happens in a learning situation, previous experience with somewhat similar devices, common sense, and perhaps some guesses, in order to indicate what seem to be desirable teaching methods. The following arbitrarily stated suggestions appear, at the present time, at least, to be reasonable.[1]

Do Not Consider the Broadcast a Substitute for Regular Teaching. A radio program is an aid to teaching, not a substitute for it. It is true that during a program the class is turned over to the broadcaster, but only temporarily; the teacher has the final responsibility for the instruction of the group. The radio program is, like a laboratory experiment, a trip, or a showing of slides and pictures, only an aid—a variation in teaching technique through which the regular lesson is clarified and made more vivid and vital.

If Possible, Avoid Auditorium and Other Large-room Settings.—Usually, the radio program should be received in regular classrooms because (1) these represent a normal teaching atmosphere and setting, and (2) needed equipment and materials—desks, tables, maps, charts, instruments, books, etc.—are available. Although occasionally some particularly appropriate program may be received in the auditorium, generally speaking, this setting is unsatisfactory because of the (1) well-known bad acoustics of most of these rooms; (2) difficulty of controlling volume so that all in the room can hear equally well and without discomfort; and (3) typical restlessness of large groups; this is true especially if the auditorium is crowded. In short, the classroom represents more of a learning, but the auditorium more of a listening, setting. A gymnasium is probably the poorest place about the school in which to receive radio programs.

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[1] Owing to a lack of space it is impossible to discuss the technical problems related to the selection and installation of receiving equipment. A good and practical presentation of this phase of radio instruction will be found in Chap. VI of Margaret Harrison's "Radio in the Classroom," Prentice-Hall, Inc., New York, 1938. See also, "How to Use Radio in the Classroom," National Association of Broadcasters, Washington, D. C., 1939, and C. M. Coon, "The Art of Teaching by Radio," *Bulletin* 4, Office of Education, 1933.

Select Programs Carefully.—An educational program, even though interesting, as it should be, is not a program of amusement or recreation; it is designed for more serious purposes. Consequently, in the first place, like any other instructional material, device, or method, it should be carefully selected on the basis of its probable value in furthering the child's learning. Although usually it should be closely correlated with curricular material, yet sometimes, as in the case of an important address, an inaugural, coronation, conference, or other outstanding event, it cannot be. The following "tentative educational guideposts" suggested to writers connected with the Educational Radio Project, will indicate some of the standards on which program material may be judged.[1]

1. Does the program have unity; that is, do the parts contribute to a central idea which, in turn, is a logical sector of a program series?
2. Is the subject matter selected educationally important? A good test of importance is whether or not the facts or anecdotes would be included in the curriculum of a progressive school system.
3. Will the program effectively induce a considerable proportion of listeners to explore the subject more completely through reading, discussion, or other self-educative activity?
4. Is there a summary at the close to fix in the listener's mind the major points brought out by the script?
5. Is the selection and presentation of the material such that the voluntary interest of the "students" (listeners) will be aroused?

In the second place, the age and grade levels of the listeners must be considered. It is rarely or never possible for all of the pupils from the first to the twelfth grades to benefit equally from the same program because the spread is too great. Even such topics as health and safety must be suited to the grade levels of the listeners. In the Chicago schools the pupils are separated into four groups, (1) kindergarten, first and second grades; (2) grades three and four; (3) grades five and six; and (4) grades seven, eight, and nine.[1] Some educators are taking the position that radio offers relatively little to the pupils of the third grade and below, but others point out that simple rhythmics, music, and specially arranged story and stunt programs are actually being used.[2] This problem of the adaptation of programs to the various grade levels is one that is as yet unsolved. Until it is solved the teacher who is most capable of fitting material to her purposes and classes will have to use her own best judgment in order to avoid programs that are either too simple or too complex.

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[1] "Education by Radio," National Committee on Education by Radio, New York, vol. 7, no. 4, April, 1937.

Of course, often it is hardly possible for a teacher to know exactly what a particular program is going to contain. However, she can check many of the available programs through the use of (1) educational bulletins published by the stations; (2) the manuals and study guides issued with particular series; (3) radio magazines, and (4) her own and colleagues' experiences with programs and program series. Even with these precautions the teacher may frequently schedule a listening that is unsuitable. However, without them she would certainly schedule a greater number of programs that are ill-fitted to her work and group.

Prepare and Have the Pupils Prepare Definitely for the Broadcast. The content of a radio program is instructional material and, like any other subject matter, will be more meaningful if suitable preparation for its reception is made by both teacher and pupil. This preparation, like any other lesson assignment, supplies a basis of knowledge or information, raises important questions, indicates values and emphases, relates it to previous work, and so develops pupil-felt needs that it will satisfy. Naturally, if the pupils feel these lacks and anticipate having them satisfied, the broadcast will be all the more successful from both an educational and an emotional point of view. In short, the pupils should not just be allowed to listen, but should be led to listen definitely for something.

This preparation may be accomplished in a number of ways depending somewhat on the type of material being broadcast. Pertinent factual material about the program and its presenters, questions, problems, and references may be obtained from the broadcaster's bulletins and manuals and contributed by the teacher and her pupils. Music programs are often prepared for by a discussion of the compositions, composers, and settings, and even by playing or singing the themes.

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[1] An excellent article is H. Kent, Planning the Educational Broadcast, *Educational Method*, vol. 18, pp. 161–166, January, 1939.

[2] See pp. 218–219 for references to programs of music for the primary grades.

Correlate and Integrate the Program with Classroom Work.—The radio program, except in unusual instances, is of most benefit when used in connection with regular classroom instruction. Not only must it be selected because of its possibilities, but the teacher must insure that it is definitely related to curricular material in order to interpret, clarify, enrich, and supplement this material. Only in such a way can it be classified and justified as an "audio aid." And, as emphasized before, this does not mean substitution for subject content.

Increasingly, programs are being prepared very specifically for classroom use. For instance, the reading of stories, poems, and correspondence in a foreign language, writing from dictation, answering questions put by the speaker, following on a map the trip of a traveler, reading a musical composition as it is being explained, exercising, pantomiming, and dancing to directions and music, are illustrations of types of school programs that are designed to be correlated closely through actual pupil activity with particular subjects.[1] Also, they illustrate a trend away from mere listening towards active pupil participation, thus obviating a weakness of radio instruction that has often been pointed out. Undoubtedly many of these programs will soon be available in transcribed form.

Insist on Close Attention.—Probably in most instances it will not be necessary for the teacher to do this because the programs themselves are usually of sufficient interest to attract and hold attention. However, the pupil should understand that absolute silence is necessary. An explanation that a radio program is usually short and highly concentrated—a sort of brief summary in which ideas are not repeated, and in which few words, phrases, and sentences are wasted, will help to prevent wandering minds. Generally speaking, the taking of notes during a short broadcast is not to be recommended because, obviously, by the time the pupil has written down one item he may have lost the two or three following points. A better plan is to have him concentrate and, if desired, write up his notes afterward.

In case the broadcast is made before a large group it may be necessary to prevent the confusion caused by rustling papers, dropping pencils, closing desks, talking, laughing, whispering, shuffling feet, and moving about, by showing how these discourteous and inconsiderate acts distract attention. This possibility of distraction is far more possible in cases of required than in cases of voluntary attendance. Pupils who will not cooperate should be excluded from these large-group broadcasts.

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[1] The complete text of two good illustrations of this technique, one in science and one in music, will be found on pp. 397–402 of the "Thirteenth Yearbook" of the Department of Elementary School Principals, 1934. See also A. Northwood, Integrating Radio and Education, *The School Executive*, vol. 58, pp. 17, 48, February, 1939, and the footnote reference on p. 219.

Incidentally, the teacher herself should set the example, because the pupils will usually reflect her interest and attention, by anticipating the program, listening closely, and showing her pleasure and enjoyment. The teacher who turns on the radio and then reads papers, computes marks, or listlessly looks out of the window in bored fashion is encouraging the pupils to do likewise and, further, she is probably wasting a program and the pupils' time.

Wherever Desirable and Possible Supplement the Broadcast with Other Aids.—The radio program comes in through the sense of hearing and, if this can be supplemented with experiences through other channels, the impressions are certain to be deeper, more accurate, and more meaningful. Pictures of the content represented and its representers, slides, maps, charts, drawings, and models as well as verbal supplementation can be used in connection with many types of broadcast materials, and these give the pupils additional "slants" that will help to explain and reinforce the points made in the program.[1]

Consider the Broadcast a Type of Assignment for Further Study.—An educational radio program is not something to be listened to, used once, and forgotten. Like any other instructional content, some of it can probably be used, directly and indirectly, time and time again in connection with the particular subject and in other settings. In one way a good broadcast is in the nature of an assignment that definitely indicates an important problem, provides enough material to solve it partly, stimulates the pupil to further thinking, studying, investigating, and experimenting, and indicates where other material may be found. With a number of educational broadcasts such as, for instance, "American School of the Air," "University of Chicago Round Table," "America's Town Meeting of the Air," "Great Plays," and "The News behind the Headlines," printed transcripts, selected bibliographies, quotations from other authorities, questions, assignments, etc., are obtainable so that the pupils can continue their study of the implications, applications, and ramifications of the topics.

Reflect Out-of-school Listenings.—Because (1) there are many important programs that are not broadcast during school hours, (2) not all schools and classrooms are equipped with radios, (3) radios are not possessed by all families, and (4) home listening is largely or entirely unsupervised, out-of-school listenings, both leisure time or pure enjoyment and school collateral listening corresponding to out-of-school collateral readings, should be encouraged and capitalized. Particular responsibilities may be assigned to individual pupils, committees, or groups, and these be held for reporting, interpreting, reviewing, summarizing, and evaluating the programs to the entire group. Even having several pupils report on the same program will often be profitable because it brings in different points of view, different evaluations, and different emphases that may be compared or contrasted. And, of course, all such assignments have real value in teaching the pupil wisely to use his radio in its natural setting. Even a general discussion of "pure enjoyment" types of programs can be of value in raising standards.

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[1] See W. M. Gregory, The Radio and Visual Aids, *Educational Screen*, vol. 18, pp. 235–237, September, 1939, for a summary of Cleveland's remarkable combination of these two types of instructional devices.

For some of the correlatable programs that are broadcast during out-of-school hours, such as for instance, "The Story behind the Headlines," "Men against Death," "Cavalcade of America," "Science on the March," "The World Is Yours," and "America's Heritage," it may often be impossible to make advance preparation because of inability to get details before the broadcast. In such instances the teacher and group together can guess at the purpose of the program or the questions that it is likely to answer or the points that it will probably cover, and they can list general suggestions on what to listen for. Here again, definitely listening for something is preferable to merely listening.

Attempt to Measure the Results of the Broadcast.—It is as logical to attempt to measure the results of a broadcast as it is to attempt to measure the results of the use of any other type of teaching technique. If no measurement of outcomes is made the teacher has no way of knowing to what extent the program represented a profitable use of her time and the pupils' time. She should have some idea of how, and of the extent to which, the broadcast influenced the pupils' thinking, added ideas or material, and developed new insights and appreciations. And, as has been suggested repeatedly in connection with the other aids, mere interest and attention, while basic and important, do not necessarily represent good criteria of value. Discussions, evaluations, criticisms, comments, reports, formal and informal tests, dramatizations, and even original reflections or imitations, will help to appraise the value of the program.[1]

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[1] In Improving Our Judgment of Broadcasts, "Thirteenth Yearbook," pp. 391–393, Department of Elementary School Principals, Francis K. Strohoefer describes an experiment carried on in Public School No. 8, Bayonne, N. J.

Do Not Schedule Too Many Radio Programs.—This is a somewhat indefinite statement because as yet no one knows just how many represents too many programs, and even this would vary with the broadcasts, schools, subjects, grade levels, and teachers' uses. However, there must be a limit beyond which additional programs are relatively ineffective. Too many radio programs, like too much ice cream, golf, swimming, or travel, represent tiresome and uninteresting experiences, and a waste of time. The radio program is an aid to teaching; it does not represent the entire field of instructional activity. When, through repeated use, it loses its novelty and appeal, it no longer aids.

Promote the Development of Discrimination in Listening to Broadcasts.—Utilizing the radio as an aid in the teaching of curricular material is, narrowly conceived, largely a temporary objective because the pupil will soon be through school and therefore not be taking school subjects. Utilizing the radio in the teaching of a discriminating use of it is a permanent objective because the average individual will probably be listening to broadcasts all of his life. This permanent objective can also be achieved to some extent because the setting is so natural and propitious. A teacher does not have to go out of her way in her attempts to accomplish it; every utilization of the radio and every discussion of a program represent material out of which a more intelligent use can be built. The pupils are led to evaluate programs, both content and performance, and so, perhaps more or less unconsciously but nevertheless certainly, to formulate criteria or standards of radio-program consumption. It is a wise teacher who recognizes this possibility and who, easily and naturally and without sermonics, guides the pupils in the originating, developing, accepting, establishing, and utilizing of these standards.

One device that not only provides a natural setting for teaching discrimination but also a just-as-natural setting for teaching oral and written composition, as well as the material of the subjects reflected in them, is the imitative broadcast. One group plans, prepares, and rehearses its program and then during the class period broadcasts it from another room to the remainder of the class. At the end of the program the broadcasters return to the classroom and a general discussion of the strong and weak points of the program follows.[1]

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[1] How one unit of an elective course, "Modern Drama," was used as a setting for the preparation and actual broadcasting of a program by high-school students is described by Ruth Nethercott and Donald E. Bird in The High-school Radio Workshop, *Educational Method*, vol. 18, pp. 176–179, January, 1939. See also E. Goudy, Pupil Broadcasts as Motivation, *The Clearing House*, vol. 13, pp. 349–

It is quite possible that within a very few years the average school will have a course, or perhaps several of them, definitely designed to teach discrimination in radio-program consumption.[1] The Radio Club, now to be found in many schools, could very easily be developed into a definitely organized and properly accredited class or course. Such a course would include (1) discussions of such topics as the history and development of the radio, technics of broadcasting, program planning and presentation, uses and utilizations, federal administration and control, financing, advertising, broadcasting in other countries; (2) trips to broadcasting studios and stations; and (3) visits from officials, technicians, and artists. A group might even conceivably plan, build, program, and manage a school or local station in connection with some organization or institution. Although a project would offer many exploratory producing possibilities, its main emphasis would be upon the development of intelligent radio-program consumers.[2]

THE PHONOGRAPH

The phonograph idea probably dates from the time of the Egyptian who some 3,500 years ago, according to the story, developed a device that reproduced the human voice. Another legend, from a Chinese book 1,500 years later, tells about a box into which a prince spoke and sent to his friend who actually heard the message. Thomas A. Edison is usually credited with the invention of the tin-foil-cylinder machine in 1877. Five years later Alexander Graham Bell, Charles Sumner Tainter, and Chicester A. Bell invented the wax-cylinder method of

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351, February, 1939. A pertinent book is Max Wylie's "Radio Writing," Farrar & Rinehart, Inc., New York, 1939.

[1] One such course at Western High School, Detroit, is described by Arthur Stenius in Radio Units and Courses in High School, *Educational Method*, vol. 18, pp. 173–176, January, 1939. See also E. D. Child and H. R. Finch, Motion Picture and Radio: An English Elective, *Curriculum Journal*, vol. 10, pp. 253–256, October, 1939. The Weequahic High School, Newark, N. J., has a regularly credited course on photoplay and radio appreciation.

[2] Through the Script Exchange of the Office of Education, U. S. Department of the Interior, Washington, D. C., a great deal of practical and tested material together with suggestions and directions for presentation, is available for use by schools, camps, conferences, meetings, and other educational groups and settings. Some of this material is quite appropriate for intraschool broadcasts, and most of it for broadcasts by commercial and noncommercial stations. It is educational in intent and high in quality. Descriptions of two projects will be found in F. E. Brooks, Effective Use of a Public-address System, "Eighteenth Yearbook," pp. 434–437, Department of Elementary School Principals, July, 1939, and M. Burrill, and G. Gardiner, Dana Airwaves, *Educational Screen*, vol. 18, pp. 323–325, November, 1939.

recording and a machine that ultimately became known as the gramophone. About the same time, Edison, also working with a wax cylinder, produced the machine which later became widely known as the phonograph. Emile Berliner in 1887 developed the disk record—a zinc plate covered with an acid-resisting film. All these first models were hand driven and made use of ear tubes. Later came the spring-motor and horn models. In 1925 the Orthophonic Victrola and the Electrola, which revolutionized both recording and playing techniques, were placed on the market and greatly popularized this form of sound transmission. Probably the phonograph was first used for teaching purposes in the public schools of Milwaukee in 1909. Since 1911, when the Victor Talking Machine Company began to develop materials for specific educational uses, this instructional aid has increased in popularity until now it is widely used.[1] In teaching music it has come to be considered indispensable.

One of the most interesting and profitable developments in the school use of the phonograph is the "choir plan," originated twenty-five years ago by C. A. Fullerton, Professor of Music, Iowa State Teachers College, Cedar Falls, Iowa. Deploring the lack of music instruction in the one-room rural schools, and recognizing the inadequacy of the teachers' training in music and the deficiency in the pupils' musical experience and background, Mr. Fullerton attacked the problem of providing a program that would (1) be inherently interesting, (2) be productive of good musical results, and (3) include some means of measuring progress. And the "choir plan," which is now used in a state-wide way by seven states, as well as by many cities, counties, and other school units, was the result.[2]

Briefly, the five steps in learning to sing the selected songs are as follows:

1. With their books open, the children listen to the song once or twice, following the music, before trying to sing any of it with the phonograph.

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[1] According to an investigation by the Office of Education, 1936, of the extent to which phonograph records are used in elementary and secondary schools, they are used "often" by about half, and "some" by a slightly smaller proportion of the schools reporting. The percentage of "never" use is generally increasingly lower above the primary grades, and also in the smaller schools. Of course, these data do not mean that all the pupils listened to records "often" and "some." They refer to the school as a unit. It is entirely possible that in a school using the phonograph "often" half of the time and "some" for nearly half, some of the pupils might "never" have listened.

[2] An account of this development will be found in the *Journal of the National Education Association,* vol. 27, p. 282, December, 1938. This article by Mr. Fullerton is entitled Vitalizing and Standardizing School Music.

2. They then sing the very easy parts with the instrument and listen to the more difficult parts, as marked in the book. The listening attitude is thus developed.
3. The process is now reversed. The children sing the more difficult parts and listen to the easier sections.
4. The entire stanza is sung very lightly with the instrument.
5. The stanza is now sung without the phonograph.

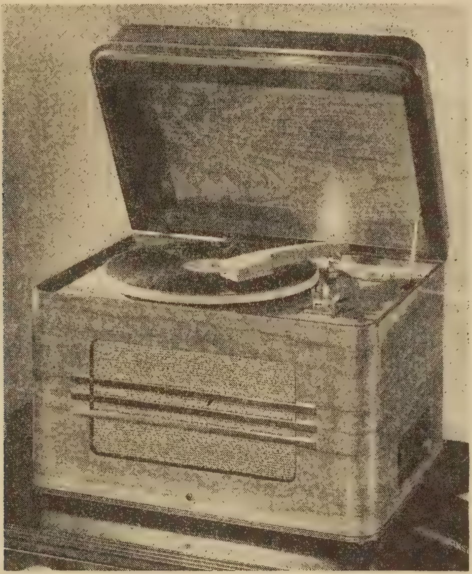

Fig. 67.—The phonograph is indispensable in the teaching of music, and it is also used with other subjects. Phonographs, records, and text and reference books are now being produced especially for school use. (*Courtesy of RCA Manufacturing Company, Inc.*)

Fifteen songs are selected, and the pupils who learn to sing these accurately become members of "The School Choir," and are awarded "Choir Membership Diplomas." These "choirs" are then assembled into community, county, district, and even state choruses which sing (with only one rehearsal) at music programs, festivals, and state fairs, and on other appropriate occasions.[1]

The expressions "record" and "transcription" are not exactly synonymous, but for our purposes here they will be considered as practically so.[1] They refer, in the present connection, to recorded or transcribed material played locally at the school, either by a single machine in a classroom, or broadcast to some or all rooms from a single distributing unit in the office or elsewhere about the school.

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[1] For this Mr. Fullerton's latest song book, entitled "New Elementary Music" (Follett Publishing Company, Chicago, Ill.) is a one-book course containing 250 songs suitable for all grades, half of which are recorded on twenty-four records (R.C.A.). This book contains detailed directions for teachers, not only for the songs but also for rhythmic development. Elementary theory is also included.

Advantages of Phonograph Records.[2]—In general, nearly all the values of instruction by radio can be ascribed to instruction by phonograph records. Of course the latter cannot bring news flashes and similar material, and perhaps they lack a bit of the atmosphere of reality that a radio program induces. However, they can bring music, addresses, textual materials, and particularized instructional lessons just as effectively as the radio, and in some instances even more so. A brief discussion of the most important of these possibilities will indicate how a phonograph and a set of records fit into the audio-aid program.[3]

Records Can Be Used Just Exactly When They Are Wanted.—It was pointed out in the previous section that one serious disadvantage of the radio is that, due to the inflexibility of school and broadcasting schedules, it is often impossible to arrange for desired listenings without disrupting the program of the school. The phonograph can be used at any time and for any length of period—short, long, or medium. It can be used at the psychological moment when it is most needed and when it will be most effective in aiding instruction.

Records Can Be Played More Than Once.—Although the radio program is played and heard but once, the phonograph record can be played and heard again and again. To illustrate this advantage in music: the teacher and her pupils may prepare very intelligently for a music broadcast, but because the particular program is played but a single time the pupils will, of necessity, (1) either attempt to master all the points portrayed or illustrated and as a result probably achieve learnings that are more or less scattered, or (2) give special attention to certain items and consequently underemphasize or miss others.

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[1] A transcription is usually a 16-in. disc, recorded at 33⅓ r.p.m. This permits the continuous recording (or reproduction) for 15 min. on one side of one record, whereas it would require three sides of a 12-in. recording at 78 r.p.m. (standard phonograph speed) to accommodate the same material. The chief advantages of the transcription are obvious—(1) an uninterrupted 15-min. program and (2) one large record instead of three smaller ones. The slower speed of transcription recording and reproduction, however, requires more accurate turntable operation to avoid "wows" and other variations in reproduction.

[2] Suggestions that might be made for the utilization of records would be approximately the same as those made for the utilization of the radio on pp. 224–231, and these need not be repeated here.

[3] For excellent material on the selection of a phonograph see the 95-page booklet "Broadcast Receivers and Phonographs for Classroom Use," referred to in footnote 2, on p. 215.

With the phonograph record this is different. It may be played several times, the pupils listening each time with a different purpose. They can listen first for a general picture or impression and then for any or all of these items: (1) the theme of the composition; (2) changes in tempo, pitch, signature, volume, etc.; (3) phrasing and accent; and (4) for the instrumentation—the contributions of the various kinds of instruments. If the pupils do not master any one of these sets of details in the first playing, the record can be played again. Further, it can be slowed down, speeded up, and even stopped at any particular point for purposes of discussion or clarification.

The Teacher Knows Exactly What the Record Contains.—Except in those few instances in which she has a complete script of a broadcast in advance, it is impossible for the teacher, even with the help of printed outlines, questions, problems, references, applications, suggestions, and other material to know exactly what a radio program will contain, and she is, therefore, in the position of the teacher whose preparation for a particular lesson is incomplete. When she plays a phonograph record she knows exactly what it contains and she can prepare her group accurately and completely for listening to it.

Phonograph Records Reflect a Wide Variety of Materials.—The individual who considers phonograph records to be representations of music only, knows very little about this type of audio aid. It is true that music does represent the greatest area in which records have been made; and hundreds of new records, not only of music programs and of individual and group music lessons, but also of music integrated with various other subjects, are being constantly turned out. But, at the same time, many other fields of education are also represented by and through phonograph records. As a matter of fact, these records are now being used in connection with all or nearly all school subjects: in dancing, rhythmics, marching, and other forms of physical education; in all forms of English, and especially in literature, dramatics, and oral composition;[1] in spelling, arithmetic, geography, and health; in foreign languages; in penmanship, shorthand, and typewriting; and in natural and social-science courses.[1] Too, they are being used successfully in work with students who are hard-of-hearing and those with speech defects. And the supply of thousands and thousands of records is being continuously augmented as educators and manufacturers cooperate in developing materials needed.

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[1] One of the newest developments in the use of the phonograph is represented by Harper and Brothers' combination of the "Mercury Shakespeare" textbooks and the "Mercury Text Records." The student may listen to "The Merchant of Venice," "Twelfth Night," or "Julius Caesar" being played just as the Mercury Theater Acting Company would produce it on the stage. Orson Welles's own stage directions are an integral part of the book, keeping the student constantly aware of the action that takes place on the stage. Down the outside margin of each page appear Welles's pen and ink drawings, visualizing stage settings, costume, and make-up in most vivid fashion. Thus Shakespeare is enjoyed, not merely read.

Records Are Inexpensive.—The average 16-in. transcription contains material for about ½ hr. of playing—15 min. on each side. The initial cost of these records is not great, and, when it is remembered that they can be used time and again, the per-playing cost of each is very small. It is just as logical for a school to build up a library of records as it is to build up a library of books, pictures, films, slides, specimens, or models. By adding two or three dozen carefully selected records each year any school can soon have a transcription library of real merit. The phonograph itself may vary in cost from a few dollars to several hundred, but because it is comparatively simple and contains few working parts, and so should last a long time, it, too, represents really only a nominal expenditure; and its upkeep expense is practically nil.

Records Can Be Made and Used.—It is now possible for the school to make some of its own records and transcriptions, either on a relatively inexpensive pregrooved type of equipment, or on the more expensive precision machine used by producing companies. The former type of transcriptions with careful handling will last for at least fifty playbacks, while the latter should be good for twice as many. With proper equipment and skill it is possible to transcribe material being broadcast, as well as that presented by the teachers and pupils themselves.

Records and transcriptions have been rather widely used in teaching certain types of speech activities, particularly oral reading and dramatics, and vocal and instrumental music. The pupil's learning is evaluated by comparing records made at the beginning and at the end of instruction, and, if desired, at certain points during it. For instance, Helen L. Hultz reports a study of the teaching of speech to two fourth-grade groups. The same teacher taught the same material in the same way and for the same period. The same techniques of recording were used with both groups, but one group was given an opportunity to hear and discuss its recordings, while the other group was allowed no such opportunity. The points covered were (1) common errors in speech—incorrect phrasing, long pauses, sentence sense, unnecessary words, repetitions, changes in point of view, multiple starts, and initial words, and (2) definiteness in telling stories. She found that the average child who did not hear his records decreased his errors by fifteen, while the one who heard his records decreased his errors by thirty-one. In addition she found that the use of a recording device made the child more conscious of needed improvement, and also motivated the instruction.[1]

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[1] "Then Came War · 1939," is an album of three 12-in. records (six sides) produced by the World Book Company, Yonkers-on-Hudson, N. Y., 1939. These records impartially present the events preceding the declarations of war, excerpts (from short-wave broadcasts) from speeches by Chamberlain, Daladier, and Hitler, and include notes on educational use by Alexander J. Stoddard.

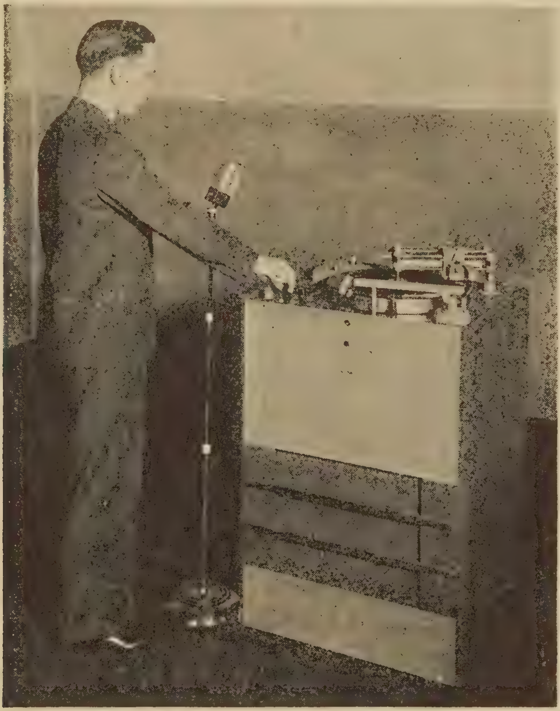

FIG. 68.—Recording and playback equipment is widely used in connection with voice training, speech correction, dramatics, and music. (*Courtesy of RCA Manufacturing Company, Inc.*)

A second and less important possibility of the use of the recording device is that of having the pupils who are going to broadcast a program present it by means of a transcription. The theory is that the presentation will be better because the transcription is made in a natural school setting and atmosphere instead of in the more or less disconcerting setting and atmosphere of the studio.

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[1] HULTZ, H. L., The Use of Phonographic Recording in Improving Children's Speech, "Thirteenth Yearbook," pp. 426–431, Department of Elementary School Principals, 1934.

SOUND AMPLIFICATION

The assembly, which has become an important educational setting in the modern school, is now capitalized in a great variety of ways by both student and outside speakers, musicians, and dramatists. However, in many instances assembly presentations are handicapped because of the poor acoustics of the auditorium. Apparently, in the planning and building of many school auditoriums, beauty and seating capacity are considered first, last, and all the time, and acoustics rarely or never. The inevitable result of a combination of poor acoustics and the natural restlessness of the average pupil at an unsuccessful presentation is even worse when the gymnasium is used for auditorium purposes.

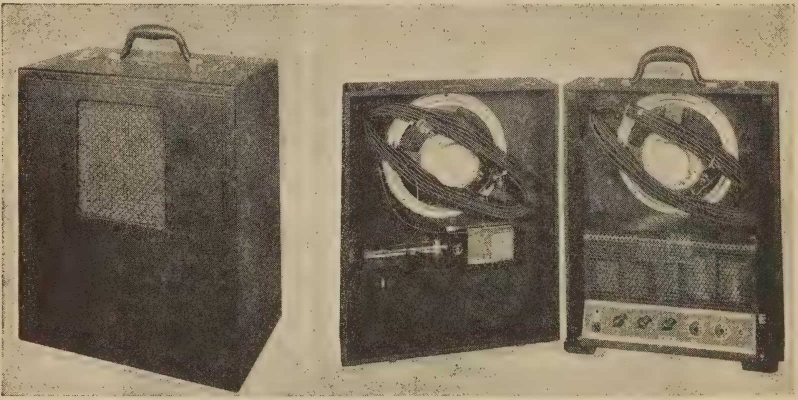

Fig. 69.—Portable sound systems can be used in a number of different school settings. (*Courtesy of RCA Manufacturing Company, Inc.*)

Sound amplification, the purpose of which is to increase the volume so that music, addresses, and dramatizations can be easily heard in the farthermost parts of the room, can often help to remedy this bad situation. Naturally, the disadvantage of this system is that the pupils who are seated in the more favorably located sections of the auditorium may be handicapped in their listening because the sound is too loud. However, a comparison of the relative advantages and disadvantages of nonamplification and amplification in an auditorium poorly designed acoustically, favors the latter plan. In addition to being used in the auditorium, amplifying systems are frequently used in the gymnasium in connection with basketball games and physical-education exhibitions, on the athletic field and playground in connection with football games and other events, and on the street in advertising campaigns of various sorts. In all of these settings sound amplification is really an instructional aid.

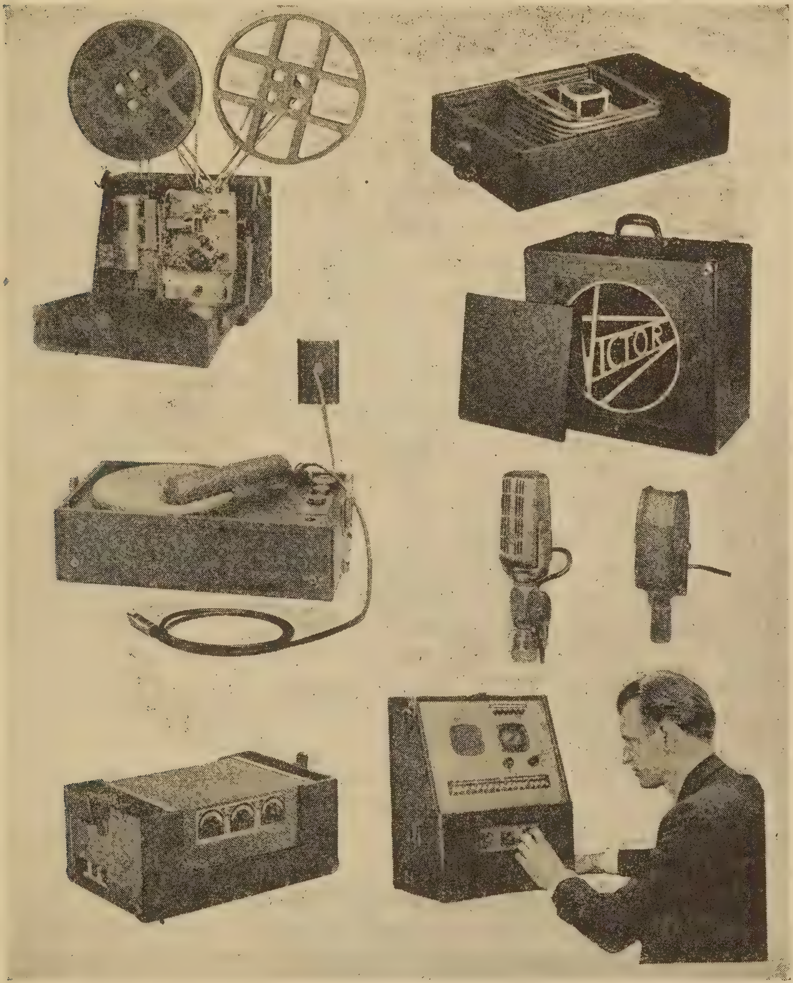

Fig. 70.—A complete inexpensive centralized-sound system. The control panel, lower right, is for radio and room controls. The amplifier, lower left, can be used with the projector in large rooms; and the phonograph can be used with either the sound projector or the central system. (*Courtesy of Victor Animatograph Corporation.*)

Amplification equipment ranges in size and cost from that which is small, portable, and relatively inexpensive to that which is permanently fixed and much more complicated and expensive. Nearly all of these types of equipment are so designed and constructed that with few changes and at small cost they can be used to reproduce phonograph records, transcriptions, and even radio broadcasts. The most highly developed type of amplification equipment is that usually designated as centralized-sound distribution, discussed below.

CENTRALIZED-SOUND DISTRIBUTION

The centralized-sound distribution system is so constructed that material—notices, announcements, directions, dramatizations, music, debates, addresses, radio programs, records and transcriptions—can be sent from the office or other centrally located room to any room or rooms in the building. The most desirable, and the most expensive, of this equipment is selective, that is, it can carry different material to different rooms at the same time, without interference between these distributions and without interference with the activities in the rooms to which no material is sent. This device, too, can be classed as a potentially important auditory aid.

The advantages of centralized-sound distribution are numerous and probably obvious. Among the most important are: notices, announcements, and directions, sent directly and not by messengers, reach all parts of the building at the same time; a great variety of material can be definitely capitalized by the proper groups without disrupting the other classes or the school; students may receive actual practice in speaking into a microphone in a natural radio setting; an assembly program can be sent to the entire school irrespective of the seating capacity of the auditorium; and general programs on health, safety, citizenship, campaigns, and drives can be brought to any section of the school, or to the entire school. The common objection to the use of this equipment is that it will be abused; that the frequent interruption of class or study sessions by routine notices, announcements, directions, exhortations, programs, and whatnots, will be disconcerting, to say the least, to the teacher and her pupils. However, whether or not this is a valid objection depends on the use made of the system and not on the system itself. We may expect to see a wide use made of this device within the next few years.

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CHAPTER XI

USING AUDIO-VISUAL AIDS IN THE LOWER GRADES

Introductory Note.—As has been repeatedly emphasized in this book, the success of any audio-visual program depends in large measure upon the manner in which the various aids are actually used in classroom instruction. The purpose of this and the following two chapters is to supplement the previous discussions of the various aids with detailed illustrations of their use in connection with a number of different subjects, and in different grade levels.

The main object in presenting these illustrations is not to provide a teacher with ready-made, set lesson plans, but rather to indicate a few of the many possibilities, and so assist her in developing her own selections, procedures, and applications. To this end the illustrations emphasize the aids and some of their varied uses and not the text of the lessons.

Obviously, it would be impracticable to attempt to illustrate all of the many possibilities of the uses of all types of aids, in all subjects, and in all levels, so selections have been made. Yearly schedules, units, lessons, and parts of lessons, as well as extracurricular activities, are included. And even in connection with some of these not all of the aids listed as being used are discussed in detail. In short, the purpose here is to present as broad a picture of applications as is possible in the limited space available. It is not claimed that these illustrations represent the last word in their uses. They represent what, in our present state of inexperience, the authors and their helpers believe to be definitely worth-while examples of some of the profitable ways in which the various aids may be used.

As indicated in the chapter heading above, this section reflects the lower grade setting. The two following chapters will present the upper grade and the high-school levels of instruction. These grade divisions are chosen arbitrarily; no significance should be attached to these classifications. However, this more or less artificial grouping of these illustrations is not by any manner of means exclusive. Doubtless some possibilities of use in the lower grades may be suggested by those described in either or both of the following chapters; and vice versa, undoubtedly some of the uses suggested in those two chapters will indicate possibilities of use in the lower grades. Further, it is quite probable that a description of use in some particular subject will suggest uses of the same aid in other subjects. Consequently, it is suggested that the reader carefully examine all of these illustrations, as well as the suggested references in connection with each, and not merely those in his own subject and grade level.

AUDIO-VISUAL AIDS IN THE LOWER GRADES

Although all types of audio-visual aid have been used in connection with lower grade classwork, obviously those that are elementary in content or material, simple in plan, construction, organization, or form, and very limited and definite in purpose, objective, or point, will be most effective. Pupils of these grades have had little experience either outside or inside of the classroom. Their contacts with other individuals have been relatively few. Their reading abilities are limited. Consequently, pictures, models, specimens, objects, sand-table activities (especially for the pupils of the lowest grades), simple constructions, and similar representations in which the main emphasis is upon the particular item itself instead of upon it merely as an illustration of textual materials, are most appropriate for these grades. Aids that the pupils can examine individually, handle, and manipulate are particularly suitable. Trips are attractive and profitable but they are usually short of duration, scheduled for school hours, and restricted in objectives and activities. The bulletin board and display ideas may be utilized provided pictorial representations, largely, are reflected with comparatively little text. Various kinds of devices—slides, flash cards, blackboard, and the like—may be used in the repetitious work of drill. Phonograph records, particularly of simple music and rhythms, are also valuable. Although there is some danger that motion pictures and radio programs may be over the heads of this group, this possibility is being constantly decreased as the needs of these pupils are being studied and definitely provided for. Due to the short attention span of these pupils, limited periods of use and variety in types of aid are essential to effective utilization.

PICTURE BOOKLETS

Kindergarten and Primary

There is practically no end to the possibilities of making picture booklets. These booklets may be either individual or class projects, or both. They may represent all types of pictures, selected on some such basis as "The Things I Like," or "Flowers (Fruit, Animals, Toys, etc.) I Like," or they may be selected to represent a single subject such as "Airplanes," "Houses," or "Animals." The pictures may be clipped from magazines, newspapers, old books, travel folders, timetables, catalogues, etc. Pupil exchanges of pictures are easily organized and promoted. These booklets, bound in colored cardboard and appropriately titled, may be used for general class examination and discussion or they may be used in an exhibit. Probably both uses are desirable, the exhibit being the climaxing event of the planning, making, and studying program. The following topics illustrate a few of the many possibilities.[1]

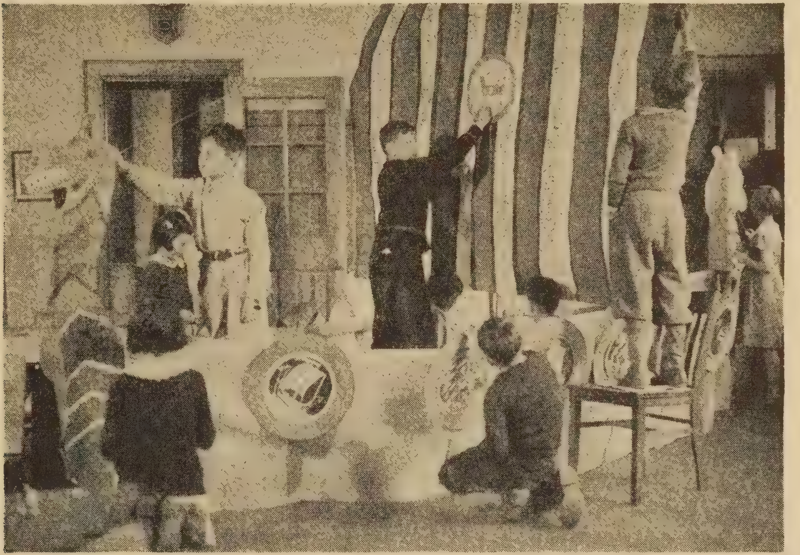

FIG. 71.—The "Reindeer of the Waves"—the culmination of a unit on the Vikings—was constructed by the pupils of the Ivy Rock School, Plymouth Township, Pennsylvania. This 14-ft. craft, carrying supplies for a ten-day voyage, was manned by twenty-six "Vikings." A study of prevailing winds determined when the sail should be used.

Airplanes
Animals
Automobiles
Babies
Bicycles
Birds
Boats
Boys
Bridges
Cars
Circus
Clocks
Dishes
Dresses
Family
Fish
Flowers
Food
Fruit
Furniture
Girls
Hats
Houses
Jewelry
Men
Pets
Radios
Ships
Shoes
Tools
Toys
Trains
Travel
Trees
Tricycles
Vegetables
Wagons
Windows
Women

[1] A pertinent article is W. Emmert, Standards and Techniques for making Posters and Booklets, *Educational Screen*, vol. 13, November and December, 1934.

BOATS[1]

Kindergarten and Primary

Paintings, flat pictures, slides, posters, stereographs, still films

The following list of materials, used in connection with one topic of a unit on Transportation in the lowest grades of the San Diego schools, not only indicates the numerous aids available, but also suggests the attractiveness of this method of presenting the subject.

- Deck plan:
  - Framed paintings: children washing deck; deck plan of cruiser
  - Poster: ocean liner—topside view
- Parts of boats:
  - Framed paintings:
    - Boats in repair dock
    - Keel and boats in dry dock
    - Tuna boat under construction
    - Lining hull
    - Siding hull
    - Keel
- Safety:
  - Flat pictures: safety ("Simple Family"); boats; canoe
  - Framed painting: fireboat in action
- Types of boat:
  - Flat pictures:
    - Liner, tug, and sailboat
    - Transatlantic liner
    - Ocean liner
    - Steamship
    - Submarine
    - Tuna boat
  - Framed paintings:
    - Airplane carrier "Ranger"
    - Coast guard cutter
    - Crew on British ship "Apollo"
    - Crew at "Colors" on "Apollo"
    - Ferryboat to Coronado
    - Freighter at dock
    - "Langley"—airplane carrier
    - Market fishing boats
    - "Pacific Queen" with sails
    - "Pacific Queen" without sails
    - Panama Pacific liner
    - Passenger liner—sunset scene
    - Sailboat at sunset
    - "Star of India"—rear view
    - "Star of India" with sails
    - "Star of India" without sails
    - Submarine above water
    - Airplane carrier
    - Battleship
    - Destroyer
    - Canoe
    - Excursion boat
    - Freighter
    - Fuel barge
    - Lumber raft
    - Lumber schooner
    - Navy cruiser
    - Navy tender
    - Oil tanker
    - Passenger boats
    - Rowboat
    - Sailboat
    - Speedboat
    - Submarine

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[1] This material was supplied by Marian Evans, Director, Visual Aids Education Activities, San Diego City Schools, San Diego, Calif.

  - Submarine and tuna boat
  - Tugboat piloting ship
  - Tuna clipper "Cape San Vincent"
  - Water tanker
  - Water taxi
  - Yacht
- Lantern slides: Harbor views
- Posters: Passenger liner towed into harbor by tugs
  - Japanese ocean liner
  - Ocean liner and sailboats
  - Passenger steamer and freighter
  - Ocean liner
  - Steamship
  - Transport
- Stereographs:
  - Ferryboat—seagulls flying overhead
  - Sailboats and yachts
  - Harbor views
  - Merchant ship
- Still film: Ships

Waterfront:
- Framed painting: fishing boat at fisherman's pier
- Motion picture film: Ferryboats (colored)
- Stereographs: fishing boats and pelicans

Where boats stop:
- Framed paintings: "Virginia" at dock; ship at dock
- Posters: Boat leaving dock
- Stereographs: Passenger liner at dock
  - Pelican watching unloading of lobster boat

THE RABBIT

First Grade

Proof that the rabbit is a universal favorite of small children is to be found in the extent to which it is reflected in pictures, films, stories, poems, songs, and games. Further, this animal is very easy to present as a school topic because of the many representations that are available. Naturally, a unit concerning the rabbit must be designed for educational purposes, and not for mere entertainment. A knowledge of the main features of the rabbit, its home, food, habits, enemies, and values, will help the pupils to take a more intelligent interest in it. Some of the aids that may be used in this connection are the following:

1. Sound film, "Adventures of Bunny Rabbit."[1]
2. Pictures: from books and magazines, as well as prints of famous paintings, such as "Boy with Rabbit" by Raeburn, and "Who'll Buy a Rabbit"?
3. An actual specimen. It is easy to obtain a rabbit as a room pet, especially at Easter time or in the spring. The pupils will learn a great deal from a firsthand observation of the animal, its characteristics, food, movements—walking, hopping, jumping, and digging; cleanliness—washing with tongue and brushing with foot; eating, looking, sitting, moving its ears; and its sound—shriek and thumping foot. A diary or daily history or "continued story" is also an appropriate project.

[1] Erpi Classroom Films, Inc.

4. Music. Nearly all children's music books contain songs that reflect the rabbit; illustrative of these are:
   Flippity Flop—"Songs of Childhood."
   My Bunny, and The Rabbit—"Music Hour."
   Easter Time—"Songs for Every Day."
   Many of these songs are pantomimic and dramatic.
5. Dramatization. Here again, dramatizing rabbit stories is always a popular diversion of small children. These dramatizations may be of read stories or they may be original.
6. Trips. These may be made to museums to see stuffed specimens in their attractive and authentic habitats; to rabbit farms, petshops, local rabbit breeders, and even to the woods.
7. Models. Clay, plasteline, putty, and similar materials may be used in the construction of models.
8. Charts. A number of illustrated charts may be made showing the rabbit's food, enemies, types of "steps," etc.
9. Original pictures of the rabbit in various positions; its tracks, its food, enemies, uses, etc.
10. Booklets. Pictures, clipped and original, jingles, poems, stories and drawings may be made into simple booklets.
11. Habitat scene. A simple habitat "group" may easily be made from a box with a properly colored background. Grass, weeds, brush, leaves, water (mirror), sand, etc., help to give it a realistic appearance. Toy rabbits, available in any toy shop, may be appropriately placed.

The following are illustrations of the types of pretest and checkup devices that may be used:

Questions

1. Why are a rabbit's hind legs larger than his front legs?
3. Where are a rabbit's ears when it is listening? Running?
4. Why don't a rabbit's feet freeze in the snow?
7. Of what use are rabbits?
9. What damage does a rabbit do?
10. What does a rabbit eat during the winter?

Multiple Choice

1. A rabbit eats nuts insects clover.
3. A rabbit is about as big as a horse lion cat.
5. Rabbit's fur is used on dishes clothing books.

YES and NO Questions

1. Do rabbits have short tails?
3. Do rabbits hear well?
5. Does a rabbit sleep with his eyes open?

Completion Sentences

1. Rabbits have ________ on their feet.
3. A rabbit's home is called a ________.
5. A rabbit shows his anger by ________ his feet.

RIGHT and WRONG Questions

1. Rabbits and dogs are good friends.
4. Rabbits often eat the bark of small trees.
5. Rabbits make good pets.

LITTLE EAGLE[1]

First Grade

Motion pictures—silent and sound, strip film, slides, stereographs, flat pictures, flash cards, blackboard, trip to library, dramatization, exhibit

This is a unit on the life and activities of a little Indian boy of about six years of age.[2] Obviously, two different types of educational objectives are concerned—learning to read, and acquiring factual material about the Indians. The unit was divided into fourteen recitations. Two of these are briefed here for illustrative purposes.

First Lesson.—The Indian Family.

Before the children came to class the teacher placed appropriate pictures on the tables, the bulletin board, and in the library corner. Indian books were also placed on the tables and on convenient shelves. A wall-reading chart about an Indian family—father, mother, child, and papoose—was made available for placement before the reading circle. Stereographs and Indian articles and trinkets—beads, baskets, items of clothing, blanket, etc., were also placed on the table for use by the group.

Upon coming to class the pupils were allowed to look at the pictures, articles, and books for a few minutes, and to talk freely about these various items. After this general introduction the teacher asked the pupils if they would like to see a motion picture about Indians. The answer of course being in the affirmative, she then projected the silent film, "Wee Ann Sees the Indians."[3] Following the projection the teacher and pupils discussed some of the things the picture showed. The teacher then gave each pupil a copy of the new reader, "Little Eagle," and allowed time for them to look through it, talk about it, and compare some of its pictures with those of the motion picture just seen.

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[1] By Gertrude Kuhlo, Irving School, Quincy, Ill.

[2] "Little Eagle" by Therese and Edwin Deming.

[3] Pennsylvania College for Women, Pittsburgh, Pa.

Flash cards, blackboard sentences, games and wall charts were used in vocabulary building in order to teach the meanings of such words as "brave," "tepee," "papoose," "moss," "deer," "tired," and "grew."

The story was now read, both orally and silently, following which the film was shown again. Opportunity was given for the reading of other Indian stories. Then the pupils were allowed to select their seatwork. Some of them drew pictures, some painted, and others modeled with oil clay.

Fourteenth Lesson.—Home Again.

The outline of this final lesson was as follows:

1. Completion of the story, "Little Eagle."
2. Group discussion of the parts liked best.
3. Show the silent motion picture, "Little Indian Weaver."[1]
4. Repeat the film, stopping at important points for discussion.
5. Complete the illustrated Indian booklet (art period).
6. Complete the sand-table project (art period).
7. Repeat the film strip "Indian Life,"[2] (language period).
8. Repeat the showing of "Wee Ann Sees the Indians."
9. A final discussion of the important points of the entire unit.

SPRING BIRDS[3]

First Grade

Films—silent and sound, trips, specimens, pictures, charts, handmade slides, music

Objectives:

To help the children (1) to become more familiar with the common spring birds in our community—robin, cardinal, house wren, and blue jay—their general characteristics, food, habits, nests, eggs, and usefulness; (2) to appreciate the place of birds in the world, and (3) to develop a desire to protect them.

Procedure (illustrated with the robin):

The children had been noticing the coming of the robins and had shown their interest by asking about them, and consequently, it was very easy to introduce the subject: it was timely.

1. The pupils were given an opportunity to tell all that they knew about the robin. Most of them knew its general size and appearance, but few knew anything about its habits. Upon being questioned about these, the pupils soon discovered this lack.

[1] University of Illinois, Urbana, Ill.

[2] Classroom Teacher, Inc., Chicago.

[3] By Gladys Hagan, Oak Park, Ill.

2. To supply more complete information, the film "Robin Redbreast" was shown.[1]
3. Following this presentation the pupils asked questions, made comments, and told pertinent stories and experiences.
4. A museum specimen was obtained and was studied firsthand.
5. Once it was suggested to them, the pupils were eager to draw pictures of the robin. These pictures were displayed to the class, and later used in booklets.

Somewhat this same general procedure was followed in the study of the three other birds. After all four birds had been studied individually, the following devices were used, comparisons and contrasts being, of course, emphasized.

1. The nests and nesting habits of the birds were shown by means of the silent film, "Bird Homes."[2]
2. Pictures of the birds, their nests and eggs, were cut from magazines, mounted and displayed.
3. A daily chart was kept, showing the birds seen, together with the names of the pupils who saw them.
4. At music time the pupils were taught the birds' songs.[3]
5. An identification game was played, using slides showing the birds in various settings, and from different angles.
6. Trips were made to a museum, a park, and to the manual-training room (to see birdhouses made and being made).
7. Slides were made from the pupils' drawings. These slides, when shown, were accompanied by "lectures" by the individual pupils.
8. Illustrated bird booklets were made by each pupil. These contained pictures, clipped and original (properly colored), stories, simple rhymes, and riddles.

Obviously, it was easy to correlate the work of this unit with the activities of other subjects—music, art, geography, language, and nature study.

A MOTION-PICTURE SCHEDULE[4]

First Grade

The following is a year's schedule of motion pictures shown to the pupils of our first grade. Some of these films were shown for pure enjoyment, some as introductions to units, and others as climaxes to the work of particular units. Much of the material of all these types of films was used in connection with our "experience charts" utilized in the oral English and written language periods. Of course, in addition to pertinent reading, other aids such as flat pictures, charts, sandbox, specimens, slides, and trips, were also used. However, the purpose here is merely to indicate our schedule of films. These motion pictures were obtained from the Visual Aid Service of the University of Illinois.

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[1] Erpi Classroom Films, Inc.

[2] Eastman Kodak Company, Teaching Films Division.

[3] From "Listen and Sing."

[4] By Florence Bond, Jefferson School, Pekin, Ill.

Month	Week	Film	Silent	Sound
September..........	1			
	2	"Wee Ann's Dog Sandy"	x	
	3			
	4	"Three Little Kittens"		x
October............	1			
	2	"Gray Squirrel"		x
	3			
	4	"Speaking of Safety"	x	
November.........	1			
	2	"Once Upon a Time"	x	
	3			
	4	"Wee Ann Sees the Indians"	x	
December..........	1			
	2	"Wee Ann's Christmas"	x	
	3	"Old Scrooge"	x	
	4			
January............	1			
	2	"Wee Ann and the Snow Man"	x	
	3			
	4			
February..........	1			
	2			
	3	"George Washington"		x
	4			
March.............	1			
	2	"Robin Redbreast"		x
	3			
	4	"Adventure of Bunny Rabbit"		x
April...............	1			
	2	"Happy Hen and Her Chicks"	x	
	3			
	4	"The Farm"	x	
May...............	1			
	2	"Animals of the Zoo"		x
	3			
	4	"Wee Ann Visits the Zoo"	x	

We found this schedule of, roughly, two motion pictures a month, integrated with teacher and pupil reading and the teacher's storytelling and with the other types of aids, to be about right for our purposes. Further, we believe that the use of both silent and sound films is preferable to the use of either type alone. Incidentally for pupils of this age suitable silent films are much easier to obtain than sound films.

A LANGUAGE UNIT ON THE PILGRIMS[1]

THIRD GRADE

Map, flat pictures, slides, sand table, models

Aim: The aim of this unit was to teach the pupils something about the Pilgrims as a basis for instructing them in the correct forms of ordinary expression.

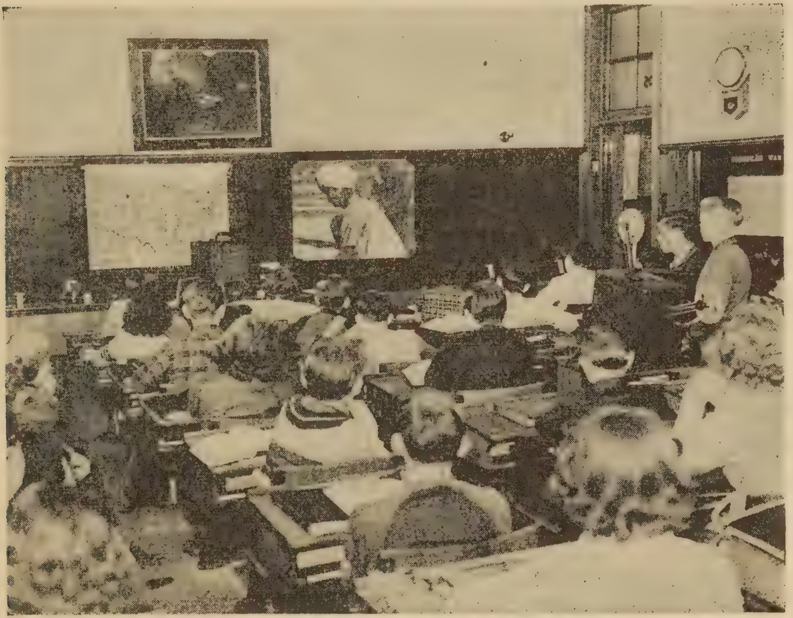

FIG. 72.—Through motion pictures these pupils are actually visiting India. (*Courtesy of Bell and Howell.*)

Procedure: The following very brief outline of the work of this unit indicates the opportunities provided through both formal and informal class settings for oral expression, and through individual and seatwork for written expression.

Monday: At the beginning of the period the pupils were asked to tell voluntarily the things in the story (which they had read previously) that impressed them the most. Such questions as the following were then raised in order to help them to become still better acquainted with the story, and to clear up any misunderstandings.

1. Why is the word "pilgrim," which means "wanderer," a good name for these brave people?

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[1] By Ruth J. Young, Gilson, Ill.

2. Why did the Pilgrims wish to leave England?
3. Why were they unhappy in Holland?
4. Describe the voyage of the "Mayflower."
5. The Pilgrims' first winter in America was a sad one. Why?
6. The following fall the Pilgrims had a fine harvest. Can you tell how some friendly Indians helped them?
7. Why did they decide to hold a Thanksgiving feast?
8. Describe the feast, and the merriment which followed it.

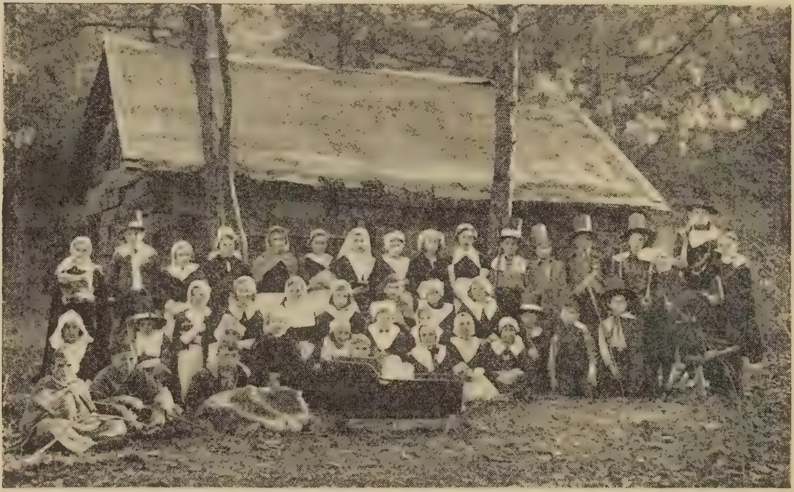

FIG. 73.—How meaningful a visualized study of the Pilgrims must have been to these Orbisonia, Pa., pupils!

In connection with these questions we used a map showing where the Pilgrims came from originally, their trip to Holland, and their route across the Atlantic. We also used several pictures, the first one of which was of a statue of a Puritan maiden and a Puritan deacon. We noted the Pilgrims' clothing—the long cape, little bonnet, high-laced shoes, etc., of the girl, and the steeple-crowned hat, long waistcoat, knee breeches, home-knit hose, and heavy leather shoes of the man. Too, we saw that each carried a Bible. We tried to see courage, patience, humor, and gentleness in the girl's expression, and the sterner qualities in the face of the man. In considering "The Voyage of the Mayflower" we made a comparison of this little vessel with the great ocean liner of today, emphasizing the courage of the Pilgrims in starting out across a largely unknown sea in such a frail craft. Other pictures, such as "The Landing of the Pilgrims," "Pilgrims Going to Church," "The Coming of the White Man," "Trading With the Indians," and "The First Thanksgiving," offered additional opportunities for an informal discussion of the time of year, weather, and condition of the country, as well as the dress, habits, ideals, activities, and hardships of these early settlers. The seatwork consisted of writing sentences about the Pilgrims, and stressed the use of capitals at the beginning of sentences and periods and question marks at the end.

We next worked on our sand-table scene. We used toy dishes, and made Indians and Pilgrims from construction paper and clothes pins, food for the feast from clay, and the log cabin from colored cardboard. For trees we used little twigs. Here again, the informal setting provided fine opportunities for functional oral expression.

Tuesday: In this lesson we studied paragraphs. The teacher explained that sentences which tell about the same part of a story belong together. For example (in referring to the story) all the sentences which tell of the unhappiness of the Pilgrims in Holland make up the first paragraph; those which describe the voyage to America compose the second, etc. Pictures and slides were used to represent each paragraph in the story. The children followed the story, with their books open, assisted by the teacher. For seatwork the pupils wrote paragraphs (three or four sentences each) about the Pilgrims.

Wednesday: This lesson was based on the use of capital letters for proper nouns. Together we went through the story and learned why capital letters were used in such words as England, Holland, God, Mayflower, December, Massasoit, and Squanto.

For seatwork we made a long table out of blocks and food for the feast out of modeling clay.

Thursday: We discussed written invitations and then wrote an invitation to the other children in the room to be our guests at a little Thanksgiving program which we, the third grade, were presenting for opening exercises on the following morning.

For this program the pupils dressed very realistically in Pilgrim costumes—steeple-crowned hats, white collars and cuffs, somber black capes, silver buckles, etc., made from paper and cardboard. Naturally, in making these costumes the pupils studied the pictures again.

THE DANDELION[1]

SECOND GRADE

Trip, specimens, pictures, posters

The dandelion, commonly found almost everywhere, represents a good topic to be used in teaching the child to love nature and to be more observant. Too, it is an excellent basis for work in art and language. The following outline indicates one method of using this subject.

I. A short nature-study trip for the collection of complete dandelion plants—roots, leaves, stalks, buds, and open flowers, flowers for each individual pupil, and heads gone to seed.
II. A discussion of the seasons in which dandelions appear, and the various types of places in which they grow.

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[1] By Helen Ganser, State Teachers College, Millersville, Pa.

III. Examination and discussion of the plants:
   1. Leaves arranged in the form of a rosette.
   2. The notched, saw-toothed leaves.
   3. Buds: covered with a green cloak.
   4. Flower: Each pupil pulls off one of the little curly yellow petals and examines it. Many of these little petals form a "head" or composite flower. Have the pupils note the fuzz (tiny hairs) at the base of each petal.
   5. Stem: hollow, filled with bitter, milky, sticky juice.
   6. Root: long and thick; takes a firm hold and so makes the plant hard to pull up.

FIG. 74.—This group of Springfield, Mo., pupils is learning how man provides for health, comfort, and beauty in his home.

   7. Changes that take place as the dandelion grows older:
      a. Bud throws back green cloak and yellow head appears.
      b. Closes at night and in the rain.
      c. Yellow flower grows taller and turns gray.
      d. Gray sails, with the seeds, are blown away leaving a head perfectly bald.

IV. Seeds: At the base of each sail is a seed; many sails and seeds.
How they are scattered by the wind.

V. Use: Do you like dandelions? Why, or why not?
What do we use them for?
   1. Bouquets and decorations.
   2. Play with them: "curls," chains, etc.

3. Tell fortunes, and the time of day.
4. Leaves used for greens and salads.
5. Wine made from the flowers.
6. Roots used for medicine.

VI. Harm: Dandelions spread so fast that they damage lawns and meadows; also crowd out vegetables in gardens.

VII. Summary of lesson. Illustrative questions are as follows:
1. How can you tell a dandelion when you see one?
2. Name all the places where you have picked these flowers.
3. Why are there so many dandelions each spring?
4. Why do men dig these plants out of lawns?
5. What did you learn about the dandelion today that you did not know before?
6. Do you think dandelions are pretty?
7. Do you suppose if there were only a few of them that people would raise them as they do roses and other flowers?

VIII. Additional Activities:
1. Write a short composition on the dandelion.
2. Memorize one of the poems given.
3. Draw pictures of the dandelion plant, leaf, root, flower, gray head, and bald head.
4. Make posters and pictures for display.
5. Write a story or poem about the dandelion.
6. Make an illustrated dandelion booklet.

HOW SEEDS ARE SCATTERED[1]

Third Grade

Specimens, charts, motion pictures—silent and sound, pictures, and posters

I. Objectives

A. General.
1. To increase the children's knowledge of nature.
2. To develop in children an appreciation of the beauty of nature.
3. To aid in the formation of habits of observation.
4. To create a desire to learn more about nature.
5. To learn of man's dependence upon nature.

B. Specific.
1. To learn how seeds are distributed.
2. To become familiar with seeds and their habits.
3. To learn how seeds are protected.

Procedure:

I. All through the autumn the pupils were encouraged to bring different kinds of seeds to school. These were placed in a box at the front of the room. One seed of each kind was mounted on a poster by the children. The remaining seeds were saved for identification and classification later.

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[1] By Wilma Spicer, Dewey School, Quincy, Ill.

II. Sound film "Seed Dispersal"[1] was shown, following this introduction: Seeds are carried to their growing places in many ways. Some of them travel miles and miles away from the mother plant before they find a place to grow. See how many methods of seed travel, or seed dispersal, you can find in this motion picture.
The film was shown in its entirety without stopping. Attractive photography, including time lapse, showed the methods of dispersal very clearly and dramatically.

III. Discussion of the film. How many ways in which seeds are carried did you see? Let us list these on the blackboard. This list and illustrations were as follows:
1. "Fly-aways"—dandelion, thistle, and cattail.
2. Winged seeds—maple, elm, and pine.
3. Tramps—"clingers"—burdock, cocklebur, flax.
4. Swimmers—coconut and yellow nelumbo.
5. Tumblers—tumbleweed, pigweed, and old witch grass.
6. Seeds animals eat—walnut, berries, apple.
7. Coasters, skaters, and gliders—locust and basswood.

IV. The film was now reshown, one section at a time, and at the end of each part the pupils were given an opportunity for questioning and discussion. The next section was not shown until the pupils fully understood the one just presented. The following questions are illustrative of those used. These questions were raised before the film was shown.
1. Have you ever carried seeds to their new growing places?
2. How did you carry them? How do you suppose plants carry seeds? Let's watch and see.

Although it is probably true that some of the pupils obtained a clear idea of the details of methods of seed dispersal from the first showing of the film, yet the second showing not only served to clarify the processes for those pupils who did not understand clearly the first time, but it also served as a review for those who understood fully. For these, it emphasized the various methods. Because of the striking dramatic quality of the film, all the pupils were anxious to see it again.

V. Other activities.
1. Small boxes, each containing nine compartments, were made and the seeds were classified by the pupils and dropped into their proper places.
2. A second seed poster was made, different from the first in that the seeds were classified according to their means of dispersal.
3. Search was made in books and magazines for stories, poems, pictures, and illustrations.

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[1] Erpi Classroom Films, Inc.

4. The pupils drew pictures illustrating the various methods by which seeds are carried to their new homes.
5. An apple and pear were cut in two crossways to show how the seeds are arranged in a little flowerlike shape. The pupils sketched this arrangement.
6. "Seed prints" were made of several of the seeds by pressing them into clay. These clay impressions were later used as a part of the exhibit.
7. A frieze was constructed by the pupils on brown paper humorously comparing the way seeds and human beings travel.
8. Discussion of how to plant seeds in order to insure their growth.
9. The song "The Seed and the Weeds" was learned during the music period.
10. Preparation of individual pupil talks on seeds and methods of dispersal.
11. Showing of the silent film "The Battle of the Plants."
12. Booklets, composed of pictures, drawings, sketches, songs, poems, and stories, were made by the pupils.
13. A program-exhibit, to which the mothers were invited, represented the final activity. The program consisted of talks, explanations, songs, poems, and stories. Interesting types of seeds were given the visitors as souvenirs.

DANSE ARABE[1]

THIRD GRADE

Blackboard, records, pictures, piano, chart

The aims of this lesson are (1) to help the children gain a picture from the music; (2) to create an interest in good music by using a suite with an attractive story; and (3) to introduce the string section of the orchestra.

Teacher: Today I am going to tell you a story about a little poor girl named Claire. It was Christmas Eve and Claire wanted a big doll so badly. She went to bed early hoping that the big doll would be in her stocking the next morning. When she awoke on Christmas morning she jumped out of bed and rushed over to her stocking. And what do you suppose she found in it? Only a plain old nutcracker!

Well, that night Claire dreamed that her nutcracker was leading the army of the lead soldiers against the Mouse King and his followers. The Mouse King was winning the battle and so Claire killed him with her slipper. When she did this the nutcracker turned into a handsome prince who took Claire to the land of the Sugarplum Fairy where she saw many lovely things.

Today we're going to do something that you may never have done before. Claire saw these beautiful things with her eyes, but we're going to see one of them with our ears. The picture that we are going to see is a Danse Arabe. (Teacher writes this title on the blackboard.) It is from a group of pieces called the *Nutcracker Suite*. (Teacher writes this on the blackboard.) There are other interesting tune pictures in the group, but this is the one we shall hear today. Now listen carefully, and be ready to tell me what you hear. (Teacher plays record, Victor, No. 6616.)

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[1] By Geneva Scudder, Gilson, Ill.

How many of you saw a picture? What was it like? Was the dance fast or slow? What sort of clothing do you think the dancers wore? If you will turn to page 115 in your music books[1] you will see a picture of the Queen of Arabia with her dancers kneeling before her. The Queen looks like a little girl, doesn't she? Right under the picture you will see a little bit of the tune which you heard on the record. Listen once more to the record. (Teacher plays the first theme.) Now listen while I play it on the piano. (Teacher plays the first theme on the piano.)

What was the main instrument when I played it for you? What are the main instruments on the record? (Teacher may have to help the pupils decide that they are violins, violas, cellos, and string bass.) Possibly you've never seen these instruments. Here are some pictures of them, and also some pictures of men playing them. (Teacher shows these pictures on the wall chart.) Which instrument is the smallest? Which is held between the knees? Which one does the artist stand up to play? Which is like a violin, but larger? This group of instruments is very important in an orchestra. We might call it the string section.

Now listen to this piece once more. See if you can hear these instruments, as well as see the picture.

(This lesson may be either followed or preceded by the teaching of the rote song "Queen of Arabia," found on page 114 of "The Music Hour," Book II.)

MOUNTAINEERS OF SWITZERLAND[2]

Fourth Grade

Maps, flat pictures, silent and sound films, specimens and objects, strip film

Objectives: To develop in the minds of the children a picture of the people of Switzerland—their homes, occupations, dress, customs, education, art and literature, and how these have been molded, directly and indirectly, by geographical conditions, climate, natural resources, and national traditions.

Lesson I: The children had taken an imaginary trip through important countries in Europe and were now approaching Switzerland. They had visited the Netherlands and the Paris basin. First we used a map to see that we were going to the southern part of Europe which is much rougher than the central part, as it is a land of mountains and valleys. The highest southern mountains, the Alps, were brought to their attention. Before projecting the map on page 74 in "Home Life in Far-Away-Lands,"[3] the following questions, to be answered after looking at the map, were handed to each pupil. (One child was chosen to point out the things mentioned, because it was dark in the room. All pupils answered questions 7, 8, 9, 10 and 12.)

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[1] "Music Hour," Book II, McConathy, Miessner, Birge, and Bray, Silver, Burdett & Company, New York.

[2] By Frances Fitzpatrick, Orion, Ill.

[3] Atwood, W. W., and H. G. Thomas, Ginn and Company, Boston, 1933.

1. Point to the mountains in the southern part of Europe.
2. Point to the mountains in Switzerland. "These are the Alps."
3. Notice that the Alps extend beyond Switzerland into three bordering countries.
4. Name these three countries.
5. Which country that you have visited has a share of the central plains and also a share of the Alps?
6. Trace the course of the Rhône River from Switzerland to its mouth.
7. Into what sea does it empty?
8. In what country is its mouth?
9. What country borders Switzerland on the south?
10. What mountains does that country share with Switzerland?
11. Find the city of Genoa on the map. In what country is it?
12. What direction is it from Switzerland?

The last four questions lead the children to see that because Switzerland has no seacoast, it must use Genoa, Italy.

Next the class looked at the map on page 125 in the text, and the physical features of the country were introduced to show how they affect the character and needs of the Swiss people. The important rivers, cities, and tunnels were pointed out. An outline of the map was drawn on the blackboard by the teacher and the children located the places mentioned above.

Then we looked at pictures in the text. Figure 165 gave the children a concrete impression of a mountain, valley, tree line, and city located in the valley. Figure 167 gave a view of the Rhine at Basel—an idea of the cities along it.

LESSON II: The silent film "The Roof of Europe" (Eastman) was shown for the purpose of arousing interest, giving the children a more definite conception of the mountains, valleys, and the life of the Swiss—their occupations, dress, sports. Also it led them to notice how location and physical features influence the character and life of people.

After the picture was shown through once, it was discussed in class and most of these points were brought out.

LESSON III: The following day the film was shown again, after which the class, with the guidance of the teacher, made an outline for a story to be written about the picture.

LESSON IV: Using the outline the children wrote stories during this class period.

LESSON V: The children read silently from the text, "Home Life in Far-Away-Lands," before the class period. Five pertinent topics, to be discussed later in class, were written on the board.

Near the end of period a committee was appointed to arrange material for a museum, with proper labels for all articles. Those who brought material

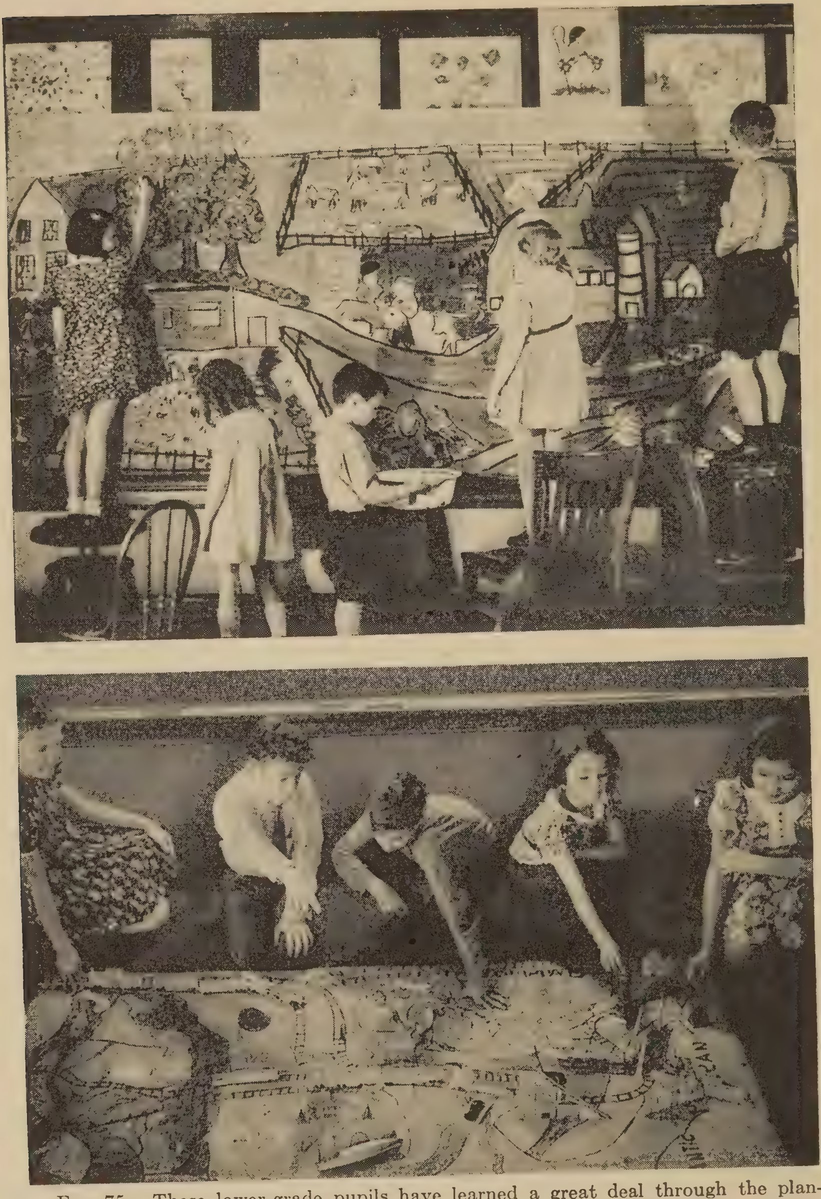

Fig. 75.—These lower-grade pupils have learned a great deal through the planning, designing, and executing of these projects in connection with their "Home-Community-Farm" and "Travel" units. (*Courtesy of Plymouth Township Public Schools, Montgomery County, Pennsylvania.*)

were given an opportunity to tell the story about the article which they brought. Articles were added as collected.

LESSONS V AND VI: The class was divided into three groups.

Group I read or reported on stories selected from the material that had been placed on the reading table.

While studying the unit, the teacher read during story hour "The Little Swiss Wood Carver," and "High in the Mountains" by Emma Brock.

Group II mounted and arranged in an attractive manner on the bulletin board pictures from advertisements, magazines, and books.

Group III visited the public library and brought to class copies of the *National Geographic*[1] and *Travel*[2] magazines that contained interesting pictures of Switzerland. This group showed and explained these pictures.

LESSON VII. Reports were completed. The pupils were given 8″ × 12″ white construction paper and colored crayons and with these they illustrated the things of Switzerland that were most interesting to them. These twelve drawings were then arranged in the form of a frieze and pasted on the blackboard so all children could see them.

LESSON VIII: As an overview of the unit, a strip film "Switzerland" was used.[3] A short description was read as each picture was shown. After the first showing, the pupils discussed the pictures. The most interesting of these pictures were shown again.

LESSON IX. Oral checkup based on questions that André (who lives in France) might ask about Gretchen's farm (which is in Switzerland). This was followed by a written completion test of ten statements.

LESSON X. A Swiss program-exhibit was planned, developed, and given to entertain another class. The program included appropriate talks, explanations, and music.

Pictures, posters, homemade Swiss dolls, and soap carvings made by the children during free periods were exhibited and explained by them.

Milk, Swiss cheese, and crackers were served to the guests.

COD FISHING

FOURTH GRADE

Maps, pictures, motion picture, specimens

The following outline indicates the use made of four types of visual aids in connection with a commonly taught lesson on cod fishing, which is usually part of a unit on "New England Industries." Reading for a general background has already been done by the pupils.

1. On a map of New England and the North Atlantic locate the following:

Boston
Gloucester
Portland
The Grand Banks

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[1] June, 1926; March, 1933; and August, 1934.

[2] June, 1930; January, 1931; and February, 1933.

[3] From the University of Missouri.

Newfoundland	Course of the Labrador Current
Labrador	Course of the Gulf Stream

2. Show pictures and slides depicting fishing equipment, methods, scenes, and settings.[1]
3. Exhibit a real codfish, piece of line, hook, bait, and fisherman's clothing.
4. Project the film "New England Fisheries—Cod." This motion picture shows very realistically settings, scenes, and processes relating to cod fishing.
5. Oral review questions and general checkup.

THE DEVELOPMENT OF THE LAMP[2]

Fourth Grade

Objects, specimens, models, pictures, handmade slides, motion pictures

This project began with a study of the methods of artificial illumination used by the cave dwellers and concluded with the modern electric lamp.

Fig. 76.—These Minneapolis pupils are learning about pioneer life by examining articles used by their ancestors.

The list of topics of this project, developed by the pupils with only a minimum of guidance by the teacher, was as follows:

1. The Torch.
2. A Shell Used as a Lamp.
3. The Lamp of the Middle Ages.
4. The Candle.
5. The Argand Lamp.
6. The Gas Jet.

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[1] Eastman Kodak Company.

[2] By Elsie I. Otto, School 9, Buffalo, N. Y.

7. The Arc Lamp.
8. Edison's Incandescent Lamp.
9. The Story of Thomas Alva Edison.

The aids used in this unit were:

1. The motion picture "The Light of a Race."[1] A class discussion of the material of the film—the types of lamps, materials out of which they were made, their general and special uses, relative values, etc., followed the presentation of it.
2. Collection and intensive study of real lamps, pictures, and literature.

The pictures, mounted by the pupils, were used in the oral English period. They were placed in the chalk trough and each child was allowed to select any picture and give a brief oral summary of the facts learned about it.

3. Pupil drawings of the various types of lamps.
4. Pupil written stories to accompany each drawing. These drawings and stories were arranged in booklet form.
5. Handmade slides. Fifteen slides were made out of the pupils' drawings and used in class discussions.

DERIC IN MESA VERDE[2]

FOURTH GRADE

Maps, pictures, trips, films, slides, objects and specimens, dramatization, diagrams

The purpose of this unit was to acquaint the pupils with the lives of the cliff dwellers and early Indians—their pursuits, customs, dress, houses, utensils, weapons, etc.—particularly those of the Mesa Verde.

I. During the entire unit, the text "Deric in Mesa Verde" was followed closely. At either the beginning or the end of each lesson, which included at least one, and sometimes two or more chapters, the pupils participated freely in general discussion. Each of Deric's adventures was so taught that the pupils were made to feel that they were actually accompanying him. Simple true-false and matching tests were used at frequent intervals in order to check the pupils' understanding of the Indian words used.

   1. Maps of the United States and Colorado.
   2. Pictures, textual, as well as those from other books and magazines. Owing to the unusual words found in the text—"atlatl," "hogans," "kiva," "potsherd," "awl," "hewe," etc.—extensive use was made of illustrations. Unusual costumes and bodily positions were illustrated by pictures of dances—Rain-Makers, Dance-Maiden, Ute-Squaw, and others.
   3. Original pictures, drawn, colored, and painted by pupils.

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[1] Visual Aids Service, University of Illinois.

[2] By Marjorie Thayer, Alpha, Ill., and Helen A. Simon, Emerson School, Quincy, Ill.

4. Objects; arrowheads, moccasins, beads, bowls, awls, etc.
5. Pupil-made imitations: gourd rattles, whistles, baskets, arrows, etc.
6. Trip to the Dickson Mounds, Lewiston, Illinois.
7. Slides, such as the following[1]

Indian pueblo
Indian baking bread
Squaw making pottery
Warriors in council
Indian home on the desert
Hopi Indian dance
Indian woman using primitive loom
Indian talking to cowboy in sign language

8. Indian songs, games, and activities.
9. Diagram showing four layers of soil. Pupil-made and labeled.

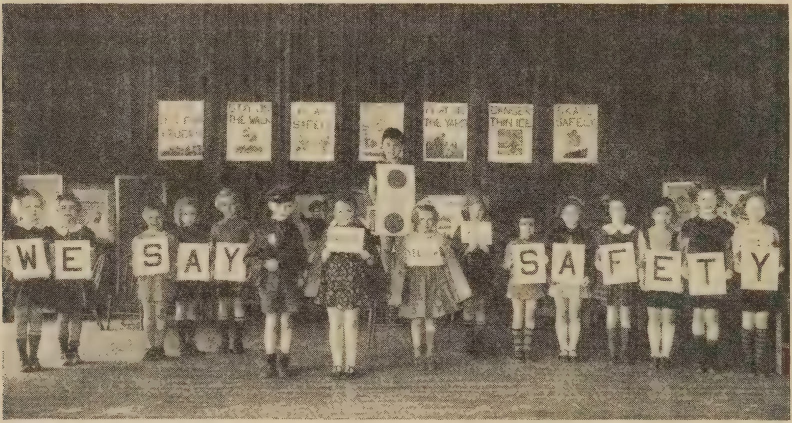

FIG. 77.—Visualization in safety education is easy to provide, and it is effective.

II. At the conclusion of the reading of the text, the pupils were shown two motion pictures, "The Mesa Verde" and "Digging Up the Past."[2] This presentation was followed by a general discussion of these films, and the relations of their picturizations to the story read by the class. Out of this discussion the program and exhibit developed very easily.

III. A program and exhibit, presented to another fourth-grade class, completed the unit. The program included illustrated stories and descriptions of material from the text, the songs and dances learned, original poems, and explanations of the objects in the exhibit. The exhibit included such objects as gourd rattles, arrows and arrowheads, bowls, pottery, tools, utensils, blankets, beads, baskets, moccasins, Indian dolls, miniature canoes, trinkets, and other relics. Some of these were borrowed and some of them were made by the pupils.

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[1] From Keystone View Company.

[2] Visual Aids Service, University of Illinois.

SILK CULTURE IN JAPAN[1]

FOURTH GRADE

Silent film, strip film, stereographs, specimens, objects

A. **Objectives:**

1. General:
   - *a.* To develop an appreciation of one of Japan's most important industries.
   - *b.* To show how the Japanese utilize all factors of their environment.
   - *c.* To compare the home industry of Japan with the mechanized industry of the United States.
2. Specific:
   To learn how the silkworm spins its silk.

B. **Teacher Preparation:**

1. Outline material to be used.
2. Make books available to the pupils.
3. Preview the silent film "Romance of Silk"[2] and make a list of points to call to attention of pupils.
4. Prepare questions on film strip "Silk."[3]
5. Place stereoscopes and stereographs on worktable. The following stereographs are used:
   #536—Silkworm Incubator
   #537—Gathering Mulberry Leaves
   #538—Feeding Silkworms
   #539—Making Nests for the Silkworms
   #540—Reeling Silk from Cocoons
   #541—Large Silk-weaving Plant
   (Keystone slides Nos. 537, 538, and 540 may be used in place of stereographs, if desired.)

C. **Pupil Preparation:**

A note on the blackboard before the opening of school calls the attention of pupils to the stereoscopes and stereographs and invites them to use these.

D. **Presentation:**

Show the silent film "Romance of Silk," calling attention to a few of the more important points to emphasize them.

[1] By Bernadine McLernon, Principal of Cook School, Galesburg, Ill. This is one lesson from the general unit on Japan.

[2] Visual Aids Service, University of Illinois.

[3] Society for Visual Education, Chicago, Ill.

E. **Procedure or Organization:**

1. After showing the film, allow the pupils to ask questions which grew out of seeing the picture and the stereographs. These questions are listed on the blackboard and then assigned to various pupils who look up the answers in the following source books which are on the worktable.
   Allen, "Asia," pp. 413–421.
   Campbell, Webb, and Nida, "The Old World, Past and Present," pp. 529–530.
   Carpenter, "Asia," pp. 92–96.
   Compton's Encyclopedia, S 144–150.
2. Discussion of the following topics.
   - *a*. Fairy story, "How the Silkworms Came to Japan," ("How We Are Clothed," p. 105).
   - *b*. History of silkworm culture.
   - *c*. Why are so many silkworms raised in Japan?
   - *d*. Feeding the silkworms.
   - *e*. Growth of the worms; casting their skins.
   - *f*. Spinning the cocoon. Care of cocoons. Appearance of finished cocoon. (Show the silkworm cocoon; have pupils note its size, color, weight, shape, etc.) Now show a piece of silk thread, piece of silk cloth, and a silk stocking, illustrating how the original thread becomes a useful article.
   - *g*. Chrysalis changing to moth. (Be sure the pupils know that the moths cut the cocoons, come out, lay eggs, and die.)
   - *h*. Necessity for killing moths in cocoons to save the thread. Method of killing moths.
   - *i*. Reeling the silk.
   - *j*. Spinning and weaving at home.
   - *k*. Spinning and weaving in factories.

All through this discussion, these questions are asked:

- *a*. Does the story in the book agree with what we saw on the film and in the stereographs?
- *b*. Did the film or stereographs show that?

3. Summary:
   - *a*. Show the film again to clear up any points, and also to unify the child's mental picture of the process.
   - *b*. Follow-up activity: Children make a booklet of silk culture. (Reference: "World Book," S 6604–6611.)

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[1] See also the references in Chapters IV–X, XI, XII.

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CHAPTER XII

USING AUDIO-VISUAL AIDS IN THE UPPER GRADES

The boys and girls of the upper grades are somewhat more mature than those of the lower grades; they have had more experience with people and things in general, both inside and outside of the school; they can read better, and think more clearly; and they can more easily recognize and appreciate the purposes of the particular aids, and so interpret and utilize them more intelligently. Consequently, more complex and complicated aids are used in these grades. Further, because these older pupils are able to read and understand, there is less of an emphasis upon pictorial representation, and more of an emphasis upon the text, with the pictorial representations being considered as explanations, illustrations, or elucidations of the textual material. Too, there is greater opportunity for a wider variety of individual activities—selecting, collecting, designing, making, originating, and planning. In the upper grades there is more continuity in lessons than in the lower grades; units are longer, and breaks between sections of particular topics are greater; hence possibilities of reference to preceding work and illustrations are more numerous and varied. Films, radio, and phonograph are more easily adapted to this group than to the lower grades. And more extensive field work, in both length of trips and breadth of objectives, is possible.

THE SIGN OF PEACE[1]

Fifth Grade

Radio and dramatization

Prebroadcast Activities:

Class discussion of the general subject, "Peace and War," and also specifically as it concerned Argentina and Chile.

Special pupil reports on the following subjects:

1. The meaning of terms "hostilities," "armistice," "arbitration," "munitions," and the like.
2. A brief survey of the geography of Argentina and Chile.
3. A brief review of the history of these countries.

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[1] Adapted from an illustrative program in "How to Use Radio in the Classroom," The National Association of Broadcasters, Washington, D. C., 1939.

4. Facts about the statue "Christ of the Andes."
5. The League of Nations.
6. The World Court.
7. The Pan American Union.

The Broadcast:

"The Sign of Peace" was a dramatization of the events in Argentina and Chile that led to a peaceful settlement of difficulties and to the erection of the statue "Christ of the Andes" on the border as a symbol of peace between the two countries.

Postbroadcast Activities:

1. The pupils were asked to talk over with their parents the question of what the United States should do to avoid war. Subsequent class discussion centered around such topics as the following:
    The conquest of Ethiopia.
    The invasion of China. The Panay incident.
    The war in Spain.
    The Monroe Doctrine.
    The effect of martial music and propaganda in war time.
    The big Navy question. Could this nation ever be successfully attacked?
    The League of Nations and the World Court.
    Fascism.
    Which is a better foreign policy for our country, isolation or cooperation?
    Should the United States protect foreign investments in war zones?
2. Dramatization, in broadcasting form, of an original playlet reflecting events of the war in Spain.
3. Debate on the respective merits of isolation and cooperation.

THE INDIAN[1]

Fifth Grade

Specimens, records, slides, stereographs, strip film, films—silent and sound, maps, flat pictures, and exhibits

This unit is based on the growth of our civilization in and around Canton, Illinois. We give our pupils a background of the past, beginning with a study of the Indians, and following with units on the explorers, the pioneers, the colonists, and Illinois and Fulton County. These units lead naturally into a sixth-grade study of the history of Canton. The four main emphases in the unit are:

I. What the Indian gave us: names, food, methods of fertilization, and general contributions—dances, music, pottery, and weaving.

[1] By Gladys Crouch, Canton, Ill.

II. Tribes in Illinois: Shawnees, Kickapoos, Sacs, Foxes, Miamis, Winnebagoes, Peorias, Cahokias, etc.
III. Wild life in Illinois: fowl, buffalo, deer, etc.
IV. Plants: maize, roots, seeds, berries, fruit, popcorn, pumpkin, and squash.

The unit is correlated with

Geography, through a study of the Illinois Valley, soil drainage, and industries.
Reading, through Indian legends and stories, and "Hiawatha."
Art, through a study of pottery, rugs, weaving, Indian designs.
Music, through Indian songs, rote songs, dances.

Fig. 78.—These dolls, accurately representing the costumes of several countries and periods, are profitably used as visual aids. (*Courtesy of Ann and Nan Davis, Abilene, Kan., and The Instructor.*)

Lesson Topics[1]

Lesson I: Introductory. General discussion, stereographs, books, pictures.
Lesson II: Organization of class into committees for study and reports on such topics as the following:

Appearance
Travel
Language
Weaving
Location
Trading
Medicine men
Religion
Shelter
Weapons
Games
Dances
Food
Music
Toys
Work
Clothing
Pottery
Education
Paints, dyes

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[1] "Lesson" refers to a section of the unit, and not to a daily recitation.

LESSON III: Location. Using maps of United States, Illinois, and Fulton County.

LESSON IV: Field trip to the Dickson Mounds near Lewistown (18 miles from Canton).

Plan the trip using highway maps of Illinois, tracing route from Canton to the Mounds. List names of villages through which we pass.

Impress upon the pupils that Fulton County was an important center of aboriginal Indian life. Tell how investigators from the Universities of Chicago and Illinois have excavated numerous places in order to make a study of these Indian burial mounds.

Explain how the valley we travel through was at one time heavily wooded and that the Indians made their homes here. Large lakes covered the floor of this valley; Thompson Lake can still be located. The bottoms were covered with fields of wild rice which furnished food to thousands of wild ducks and other fowl, while clams and fish were abundant, so food for these people was plentiful. The Illinois River offered a natural highway for canoe travel. This region represented an ideal location for the Indians.

At the Mound call attention to the burial position of the bodies, and the relics—spears, beads, tools, pots, pipes, arrows, etc., that were buried with the bodies.

LESSON V: Follow-up of the trip. Informal discussion.

LESSON VI: Correlation with language. Talks and compositions.

LESSON VII: Correlation with drawing: Draw rugs, bowls, clothing, and tents, characteristically decorated. Show "Indian Life," unit B (The Classroom Teacher, Inc., Chicago,) and stereographs #IB11, #1B1, #1B11, #124, and #27-1 (Keystone View Company). Emphasize the importance and relationship of Indian art to our present-day art.

LESSONS VIII–IX: Homes of American Indians.

1. Have pupils tell about Indian homes or pictures they have seen.
2. Read Dearborn's "How the Indians Lived," and Lacey's "Living Long Ago and Now."
3. Examine pictures in books available.
4. Show set "Ten Indian Pictures" (Keystone View Company).
5. Use stereographs #246, #182, #263, #290, and #205.
6. Show still film Indian Unit 1B1 (The Classroom Teacher, Inc.).
7. Construct models of the tepee, long house, and adobe house.

LESSON X: Review. Show film "Life of the Plains Indians" (Society for Visual Education, Inc. Chicago).

LESSON XI: Use Longfellow's "Hiawatha" as literature study.

The period reflected in "The Childhood of Hiawatha," will have been covered in the previous work.

Show "Hiawatha," a one-reel silent film (International Education Pictures, Inc., Boston, Mass.)

LESSONS XII–XV: Complete drawings, sketches, stories, poems, etc., and combine these with pictures and clippings into books for the pupils to keep.

Suggested Activities[1]

1. Make picture dictionaries of Indian words and phrases. This helps in spelling, language, and reading.
2. Make a wigwam in one corner of the room.
3. Make beads of clay and paper.
4. Make burlap rugs with designs painted on in lacquer.
5. Weave rugs on loom. Silk stockings can be dyed, cut, and used.
6. Bring smooth stones and grind corn meal.

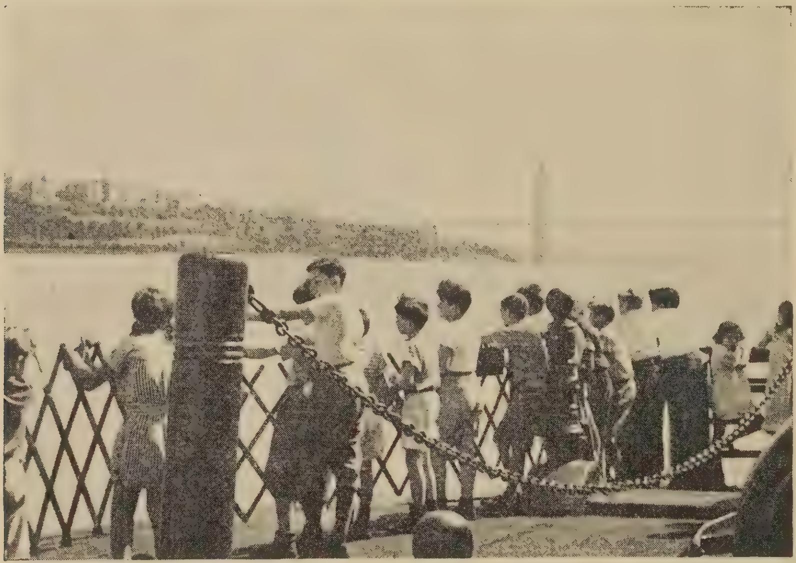

Fig. 79.—These New York youngsters are crossing the Hudson on a field trip to the Palisades. (*Courtesy of Brooklyn Children's Museum.*)

7. Make pottery of clay, using coil method.
8. Make Indian dolls or dress other dolls.
9. Illustrate stories and poems.
10. Make posters of cut paper.
11. Make papoose cradle.
12. Make papoose blanket of flannelette; design with crayons.
13. Make Indian drums of oatmeal boxes and draw designs on them.
14. Make lantern slides using etched glass and colored crayons.
15. Pop some corn for the group.
16. Make feather hats.
17. Make costumes of gunny sacks.

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[1] Although the exact schedule varies each term, every class carries out a number of these activities.

18. Make scrapbooks of pictures, sketches, clippings, etc.
19. Plan a picnic at the park playing Indian games, wearing Indian costumes, serving Indian food, etc.
20. Make Indian dresses from dry cleaners' brown paper bags and decorate with Indian designs.
21. Make a picture of what you would like to do most if you were an Indian.
22. Assume you are an Indian child, and select one of the names below, or originate another name for yourself. Tell why you like this name.

Early Day
White Cloud
Morning Flower
Red Feather
Big Eagle
Running Wolf
Morning Star
White Eagle
Black Hawk
Blue Sky
Four Winds
Black Beaver

PUEBLO INDIANS[1]

Fifth Grade

Handmade slides

The Pueblo Indians, true natives of our country, are interesting to children in third, fourth, and fifth grades. Their way of living is an excellent example of man's adaptation to his physical environment. Their thick-walled houses, agriculture by irrigation, dry farming, and their crafts show this adaptation.

The following six pictures, which are illustrative of the many that may be produced, can be easily traced on slides and projected on the screen. The using of such handmade slides represents a good basis for an introductory discussion of Indian Life in the Southwest.

1. Indian pueblos on a mesa; other mesas and mountains in the background.
2. An Indian pueblo with an Indian woman in front of the oven; the drying racks at one side.
3. An Indian man weaving a blanket.
4. Indians selling pottery and blankets to tourists.
5. An Indian family on a donkey.
6. An Indian cultivating his patch of corn.

Keystone crayons—orange for sand, green for foliage, blue for sky, purple for mountains, and red for cliffs—will show the brilliant contrasts.

COTTON[2]

Fifth Grade

Slides, film, and blackboard

Introduction. In 4*A* you learned about the necessities of life. Let's list them on the board. Which do you think is most important? Why?

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[1] By Ann Gale, Lindblom High School, Chicago. Courtesy *Educational Screen.*

[2] By Mrs. Bashowitz, New York City. The numerals refer to New York State Department of Education catalogue numbers. Courtesy *Educational Screen.*

You have mentioned clothing; from what is clothing made? Today we are going to learn about one of these materials, cotton.

Map Slide (DC 8) In what group of states is cotton grown widely? (Tell about the surface of this group of states.) What else do you know about the land? What makes it fertile?	I. Southern States *A*. Surface. Lowlands: plains. Moist: fertile.
Map Slide (D 2) About how much rainfall do we need for cotton? (40 in.) What is the climate of this group of states? What brings rainfall to this section? Now that we know what climate and what kind of land are needed for the growing of cotton, let us find out how it is planted, raised, and finally made into clothing. During March or April the ground is plowed and a good seedbed is made. Seeds are sown 3 or 4 ft. apart by a machine and covered with a planter. How do you think this work was done years ago? Which is the better way? Why?	*B*. Climate. Forty inches. Cool-warm winters. Hot summers. *C*. Cotton industry. 1. When planted? March or April. Ground plowed. 2. How planted? 3 or 4 ft. apart by machines.
Slide (DNO X 95) During what season was this picture taken? How do you know? Describe the cotton plant. Later we find blossoms on this plant before the cotton boll develops.	3. How harvested? By hand. Cotton picking.
Slide (DNO X 64) Compare size of plantation with previous slide. What season of the year? Why? Who does the picking of cotton usually? Why? (Show cotton boll to class.)	
Slide (Keystone 117) Who else is working besides the negroes?	
Slide (DS Y 1) What is this man doing? Feel the cotton bolls. What do you find inside? Try to pick it out. What happened? For many years negroes picked these seeds by hand until ________	4. Ginning. Seed. 1792
Slide (TD Y W D) Eli Whitney invented a machine called ________.	Eli Whitney Cotton gin
Slide (TD CO 57) Cotton gin to separate the seed from cotton. What effect do you think this invention had upon the cotton crop? Why?	

Slide (Ds Y 2 and Du NY 4)	
What are wagons waiting for?	
After the cotton is separated from the seed it is put into what? Describe a bale.	5. Bales, 500 lb. each.
Slide (Dy Y SY 119 Ds Y 3)	6. Shipping of cotton.
How are bales shipped?	Train, boat, truck.
Slide (US TS 54)	
Cotton Mill. What do you see here?	

Questions for Organization

1. The enemy of the cotton plant is the ________ ________.
2. Two things made of cotton are ________ and ________.
3. The machine that separates the cotton from the seed is called a ________ ________.
4. Cotton is packed into ________.
5. Cotton is mostly picked by ________.
6. The cotton gin was invented by ________ ________.
7. To kill the weevil the plant is sprayed with ________.
8. From the cotton seed we get ________ ________ ________.

Introduction to Film

Do you think you can tell the story of the cotton plant? There are a few things which we still have not learned from the slides and which the motion picture will show us.

How many have heard of the "boll weevil?" What is it? How do the farmers kill the weevil?

Watch the film for the answers to these eight questions. At the end you will have a test of the same questions. (Show film.)

Test Questions on Film

1. Who lives on a plantation?
2. What is a plantation?
3. Tell how cotton seeds are planted.
4. What is the boll weevil?
5. How is cotton harvested?
6. What is done to cotton after it is picked?
7. How is it shipped to the gin? To mills?
8. What are some of the things made from cotton?

Topics for Discussion After Showing the Film

1. Life on a plantation.
2. Planting, thinning, and protecting cotton plants.
3. Harvesting the cotton crop. Ginning cotton.
4. Shipping cotton.
5. Making cloth.

6. Some uses of cotton and cotton seeds. Effect of the invention of the cotton gin.

WONDERS OF THE SKY[1]

FIFTH AND SIXTH GRADES

Trip, charts, slides, instruments, flat pictures

I. Initial preparation:
  Study and discussion of
  1. The solar system—elements, location, organization, etc.
  2. Astronomers—early and recent.
  3. Observatories and telescopes—types, sizes, and locations.

II. Trip activities:
  1. Visit an observatory; learn its history, uses, etc.
  2. Watch a demonstration of the operation of a telescope.
  3. View the heavens through the telescope.
  4. Listen to an illustrated talk on heavenly bodies, astronomers, observatories, and telescopes.

III. Integrating activities:
  1. Look up and report early myths about constellations; contrast with those of today.
  2. Draw charts locating planets and constellations, showing relative sizes, distances from the sun and earth, etc.
  3. Discuss telescopes and other equipment.
  4. Take an imaginary trip to the moon.
  5. Build a small telescope.
  6. Make a report to other classes or at an assembly program.
  7. Post a bulletin-board display of pictures, drawings, and clippings.

ISTANBUL, A DECAPITATED CAPITAL[2]

FIFTH TO EIGHTH GRADES

Radio, map, slides, products, and puppet

This program was one of a series designed to supplement the work in upper elementary geography classes. The broadcasts dramatized the travels of an American family in foreign countries.

Prebroadcast Activities.

Since the children had not been studying this part of the world in their regular class work, it was necessary to lay a rather careful foundation for listening. Such activities as these were found valuable:

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[1] Adapted from Ralph D. Horsman, Visiting and Studying Local Community Institutions, "Eighteenth Yearbook," pp. 465–471, Department of Elementary School Principals, 1939.

[2] From "How to Use Radio in the Classroom," The National Association of Broadcasters, Washington, D. C., 1939.

1. Map study of the area in which the scene was laid.
2. Appointing a committee to mark places in books where information about the subject could be found. (Supplementary reading was carried on by children in their spare time.)
3. Setting up an electrical stereopticon machine with pictures of the region.
4. Teaching the meanings of such words as "Mohammedan," "mosque," "minaret," etc.

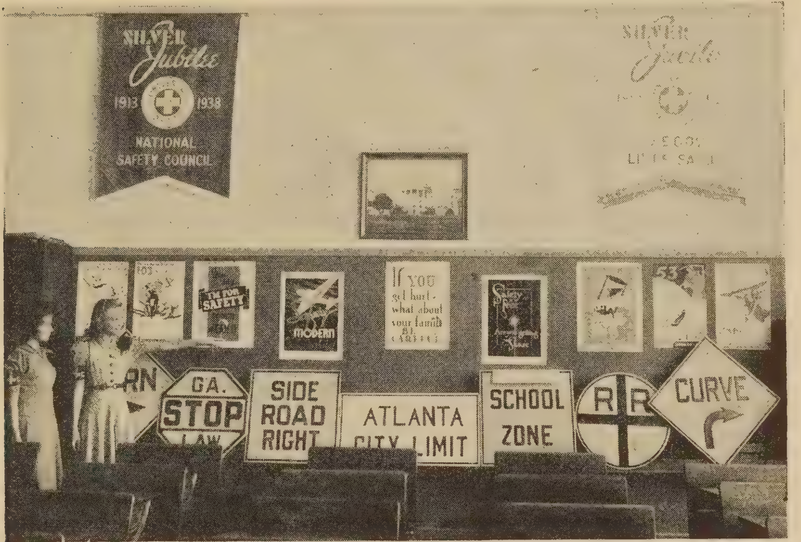

FIG. 80.—This school exhibit acquaints the pupils with road signs and also emphasizes the observance of them. (*Courtesy of National Safety Council.*)

5. The mother of one of the pupils had lived in Istanbul as a child, so she was invited to listen to the program with the class.

Postbroadcast Activities.

1. During the discussion following the broadcast these and other points came up:
   - *a.* Reasons for moving the capital.
   - *b.* Reasons for the long dry summer.
   - *c.* Why the Black Sea has bad storms in summer.
   - *d.* What effect the geography of the country has had on the customs of the people.
   - *e.* The Mohammedan religion.
   - *f.* Westernizing influences in the East.
   - *g.* The Turkish Youth Movement.
2. Several of the children read for more information on phases of the topic in which they were particularly interested.

3. A collection of sample products of Turkey was made.
4. One of the children made a puppet dressed in native Turkish costume.

Comment.

The program succeeded in giving the pupils the feeling that Turkey was a place where real people lived rather than something on a map in a geography book. They gained some familiarity with the customs of the country and a more sympathetic understanding of its problems.

THE EGYPTIANS[1]

Seventh Grade

Maps, flat pictures, news items, sand table, dramatization, globe, text illustrations, films, trips

I. Assignment.
  A. Theme: The early Egyptian civilization and its contributions to life today.
  B. References: Bruner-Smith, "Social Studies," Book I; McQuire and Phillips, "America's Heritage from Long Ago."
  C. Study Questions:
    1. How was Egypt well suited to be an early home of civilization?
    2. What observations of the early Egyptians had led to developments in civilization?
    3. What climatic conditions of Egypt aided the development of civilization?
    4. What contributions to civilization have come from the Egyptians?
    5. Through what mediums have we learned so many facts about the Egyptians?
    6. What modern developments, accepted phases of life today, may be credited to the ancient Egyptians?
  D. Activities:
    1. On an outline map locate (*a*) Egypt, (*b*) the Nile River, (*c*) Valley of the Tombs, (*d*) Mediterranean Sea, (*e*) Red Sea, (*d*) Thebes, (*g*) Cairo.
    2. Keep a scrapbook of pictures, news items, etc., concerning Egypt then and now.
    3. Review a book of Egyptian history.
    4. Construct a sand-table scene of Egypt.
    5. Make a set of pictures showing daily life of the Egyptians.
    6. Make a frieze of some Egyptian activity.
    7. Write a short play depicting some phase of Egyptian life.
    8. Prepare a short talk on one of the following:
      a. How the pyramids were built.
      b. The great Sphinx.
      c. What the temples and tombs tell about old Egypt.

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[1] By Frieda Zimmerman, Washingtoe Grammar School, Washington, Mo.

d. How the Nile River helped to give Egypt a great civilization.
e. The contributions of the Egyptian craftsmen.

II. How aids were used.
A. Flat pictures were placed on the bulletin board the day before assignment was made.
B. Large wall map of Africa and globe were accessible at all times during the unit.

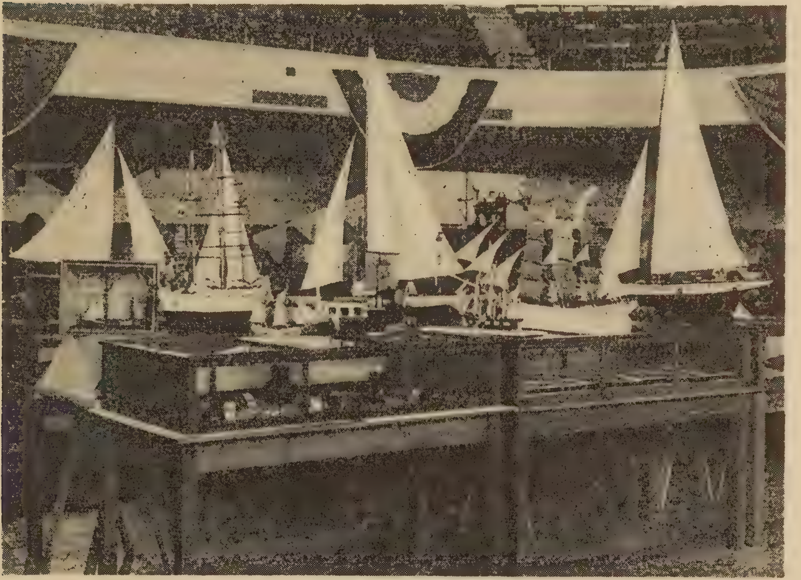

FIG. 81.—A school hobby show or exhibit must, of necessity, be based on a careful and detailed study of pictures, drawings, charts, diagrams, objects, specimens, models, and other types of visual aids. (*Courtesy of San Jose, Calif., Public Schools.*)

C. Films "Pyramids" and "Egypt" (Eastman Classroom Films, Inc.) were shown before unit assignments were made. The following outlines were presented to pupils as a guide to viewing the films:

1. Geography:
    - Physical features
    - Climate
    - Vegetation
2. Cities:
    - Buildings
    - Activities
    - Crafts
    - People
    - Activities
    - Occupations
3. Transportation:
    - Methods contrasted with modern
    - Products transported
4. Life of the people:
    - Dress
    - Food
    - Occupations
    - Homes
    - Luxuries
    - Pastimes

5. Pyramids:
    - Location
    - Roads: travel
    - Houses
    - Ruins
    - Scenes
    - Vegetation
    - Methods of construction of the pyramids.
    - Arts and crafts employed in their construction.
    - Materials used and floor-plan arrangement.
    - Contrasts with our methods of construction.

D. A test followed the showing of these films, a pretest for the unit. As the unit progressed, parts of these films were reshown for inquiring minds, with additional comments by pupils and teachers. At close of the unit the films were reshown to the class in their entirety. A completion test (same as pretest) was given following the last showing of the films, as a check for facts and observations.

E. The assignment was made and attention called to illustrations in the texts.

F. As work on the activities developed (*a*) sand-table scenes of Egypt were constructed, explained, and discussed; (*b*) outline maps were completed; (*c*) the pictures and frieze became part of room decorations; (*d*) a play was written and presented.

G. The trip to the art museum. Arrangements were made with museum authorities, and with mothers who acted as chaperones. Guide sheets for pupil observation, and equipment—kodaks and notebooks—were prepared.

The trip was made by the school bus. Interesting items along the way were pointed out by the teacher. At the museum the group visited the Egyptian room, listened to the lecture, and then browsed about for items of interest. News items were exchanged on the return trip.

The checkup was in the form of reports and a general class discussion.

The pictures brought back were organized to form the nucleus of a permanent record of school activity, to be used as sources of material for later talks and reports.

CHINA[1]

Seventh Grade

Handmade slides and dramatization

An Assembly Program

Each member of the class selected and worked on a topic with a view to presenting it before the entire school, as a part of a "Lecture Tour of China."

On the basis of competition, in content and presentation, eight pupils were selected by the class and teacher.

Each lecturer selected a picture or drew one to illustrate his topic.

Two pupils made these slides for all the lecturers.

Part I on the program consisted of these illustrated talks.

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[1] By Harry J. Mehr.

Part II was a dramatization of "The Sorcerer of the White Lotus." The story was told by a pupil who, at appropriate places in it, stepped aside and allowed the actors to depict the action. The settings for each of the five scenes of the dramatization were projected from slides.

ART UNIT ON MEXICO[1]

SEVENTH GRADE

Objects, specimens, and individual projects

Objectives.

A. The ability to recognize and choose objects used in daily life having artistic as well as utilitarian values.

B. To release the creative abilities of the children through the development of handicraft skills.

Procedure.

A. Foundation for lesson.

1. Building a background.
   Foundation of facts learned in geography formed the background for the understanding and enjoyment of Mexican Art.
2. Activities to stimulate interest on part of children.
   Following two weeks of study in geography, the teacher of Art staged an exhibition of Mexican handicrafts—leatherwork, metalwork, weaving, pottery dishes, lacquered and painted wooden bowls and boxes, and painted furniture.
3. Class discussion revealed that:
   - *a*. The Mexicans had made these objects for their own use.
   - *b*. The women had woven the belts, aprons, rugs, purses, and tapestries.
   - *c*. The men had made the silver-studded belts, tin-framed mirrors, sconces, and other metal objects.
   - *d*. These objects were inexpensive enough for even the humblest home to own.
4. Activities:
   It was decided that American children could make and decorate personal belongings; have household furniture and utensils arranged in a manner suitable for use in America; and that these things could be just as beautiful as those from Mexico, provided they were carefully planned and made.

   Each pupil in the class made something that would be "fun to make" and that would be useful to himself or herself. Some of the objects made were the following:
   - *a*. Metal bracelets, woven belts, pocketbooks, and table covers were made by the girls.

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[1] By Alma Gasslander, State Teachers College, Indiana, Pa. This is a brief of a lesson appearing in *Educational Screen*, vol. 19, pp. 30, 32, January, 1940.

- *b.* Metal-studded and decorated leather belts were made by the boys.
- *c.* Porch lanterns, decorated with nail-hole designs, were made from tin cans.
- *d.* Aluminum letter openers, and tin and aluminum ash trays.
- *e.* At least one piece of pottery, decorated and fired, was made by each pupil.
- *f.* Other activities included painting of furniture, wooden bowls, and plates, wood carving, and modeling.

Outcomes.

- *A.* Development of tastes, and the realization that good design rather than cost makes one's daily surroundings pleasant.
- *B.* The development of new skills and techniques resulting in permanent hobbies on the part of some pupils.
- *C.* Greater joy in creative endeavors and self-expression.

PLANTS AND ANIMALS[1]

Eighth Grade

Films—silent and sound, strip film, slides, bulletin board, experiments

This topic offered so many opportunities to provide for individual differences that it was decided to work a notebook in addition to the contract. This notebook was to be made up of short articles on the animal and plant life to be found in the various regions as indicated by the topics listed below.

In order to prepare the pupils for the aids, a number of pertinent questions were raised previous to presentation. Naturally, in this pretest only a few of the questions were answered correctly. The pupils were asked to watch closely for confirmation or correction of these answers, as well, of course, as for the answers to those questions which were not answered. The questions are illustrated in two of the topics shown. A few of the aids, such as for instance, "How Nature Protects Her Animals," "Weather," "Clouds," were used in connection with more than one topic.

I. How the Earth's Motions Affect Conditions on It.
II. Winds and Ocean Currents.
III. Climate and Life along Rivers.
IV. Climate and Life in the Arctic.

What are some of the causes of the formation of the Arctic regions? What kinds of plants are found in these regions? What kinds of animals? How are these plants and animals protected by nature against the cold? How do they protect themselves against it?

Aids used:

- 16-mm. silent films:
  1. "Alaska."
  2. "Alaska Wild Game."

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[1] By Effa Swanson, Westlake Junior High School, Oakland, Calif.

3. "Ice Breakup in Alaska."
4. "Glaciers."

16-mm. Sound film:
  "How Nature Protects Animals."

Bulletin-board material:
  1. Pictures and articles brought by pupils.
  2. Flat pictures provided by the teacher.

Filmslides:
  1. "Weather."
  2. "Climate of the Pacific Coast."

V. Climate and Life in the Desert.
VI. Life of the Seashore and the Sea.

FIG. 82.—This pupil is watching a Cecropia moth emerge from the cocoon he brought back from a field trip.

What are some of the typical features of the seashore? How does the environment of the seacoast change every twenty-four hours? What is the typical animal life found in the tide pool? Why are these animals made the way they are? How do these animals feed? Upon what do they feed?

What are the typical conditions to be found in the sea? Would the temperature of the ocean be the same in all regions? Why not? Where is the Sargossa Sea? What type of life is found there? What forms the food of the animals of the ocean? How are deep-sea animals adapted to the extreme pressure and darkness of the ocean?

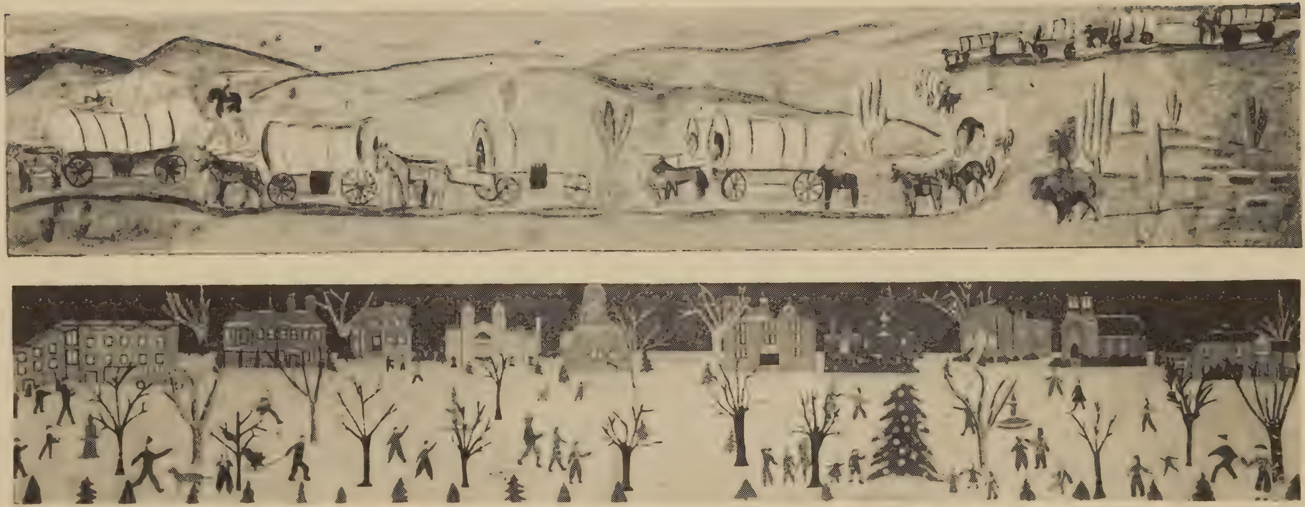

FIG. 83.—Murals often are the outcome of pupil study. The top illustration, "The Covered Wagon Trail," was made with art crayons. The lower cut-paper mural, "Christmas on Barker Common," was made from pupil sketches "on location." (*Courtesy of Margaret Noel, Fredonia, N. Y.*)

Aids used:
  16-mm. silent films:
    1. "Tuna Fishing."
    2. "Beach and Sea Animals."
  16-mm. sound films:
    1. "Beach and Sea Animals."
    2. "How Nature Protects Her Animals."
  Filmslides:
    1. "Weather."
    2. "Clouds."
    3. "Climates of the Pacific Coast."
    4. "Seashore Life."
  Slides:
    Reptiles, mammals, birds, fish, etc.
  Flat pictures:
    Provided by both teacher and pupils.

VII. Life in the Temperate Region.

In addition to the aids mentioned above, the following were also used in connection with the other topics:

  16-mm. silent films:
    1. "Arid Southwest."
    2. "Everyday Life of Our Common Birds."
    3. "Nomad Life in Colorado Desert."
    4. "Rubber—Conquering the Jungle."
    5. "Tame Wild Life in Yosemite National Park."
    6. "Termites."
    7. "Water Cycle."
    8. "Wild Animal Life in Colorado Desert."
    9. "Yellowstone National Park."
  16-mm. sound film:
    "Wearing Away of Land."
  Experiments and Demonstrations:
    Showing the motions of the earth.
    Showing the formation of clouds.

WORK, POWER, AND MACHINES

Ninth Grade

Films, bulletin board, handmade slides, pictures, models

Aids Used

1. Films: "Simple Machines." "Compressed Air."
   "Atmospheric Pressure." "Water Power."
2. Bulletin board:
   Pictures of several types and kinds of simple and compound machines.

Pictures showing early industry and tools: Comparisons of these with modern equipment and methods.
Pictures showing free and compressed air at work.
Pictures showing water at work.
Graphs showing multiplications of power.
How friction is overcome.
Articles concerning pictures of great engineering feats which would have been impossible without modern machinery; the Bay bridges, Boulder Dam, Keokuk Dam, Empire State Building, New York subway, and Panama Canal.

3. Handmade slides: illustrating principles of siphon, levers, hydraulic press, pulleys, inclined plane, air and water pumps, turbines, etc.
4. Models: simple working models of steam engine, gas engine, pulleys, jackscrew, types of levers, windmill, water pump, gears.
5. Demonstrations: For class and assembly programs, of the various types of principles and machines.

THE SYMPHONY[1]

Upper Grades

Slides, records, pictures, blackboard, films

Introduction. As an introduction to the unit on Beethoven's *Symphony No.* 3, the following slides were shown and discussed by the class:

1. Instruments of the modern symphony orchestra and band. (The music of each illustrated through the use of Victrola records in conjunction with the slides.)
2. Symphony study: (*a*) Haydn; (*b*) Beethoven; (*c*) Schubert.

Preparation:

1. Collected a number of pictures from magazines and books, illustrative of the lives of Napoleon and Beethoven and the principal and subordinate themes of the symphony to be studied. These were subsequently photographed and made into slides.
2. Copied certain themes of *Symphony No.* 3 on the blackboard: pupils copied these in their notebooks.
3. Discussed in the classes the film "Life and Loves of Beethoven," which was to be shown in the local theater during the week of study and which the pupils were requested to see.
4. Selected suitable Victrola records to be played in conjunction with the showing of the slides.

Procedure:

I. Review.
  1. Instruments of the symphony orchestra. Played several records pointing out the instruments as they were played.

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[1] By Onnolee J. Folts, Englewood Junior High School, Englewood, N. J.

2. The form of the symphony. A discussion of the structural form of a symphony compared with the sonata. Pointed out the use of the principal and subordinate themes.
   a. Showed examples of the above themes by the use of slides. Played the selection on the piano at the same time.
   b. Had children copy themes in the notebook.
      Exposition.
      The development.
      The recapitulation.
   c. Played examples of the following from the Goettchins analytical edition of *Symphony No.* 3 of Beethoven:
      Exposition:
         Statement of the principal theme.
         Showed children principal theme.
         Played and had children hum the principal theme.
      Transition:
         The meaning of a transition.
         Examples of transition illustrated on the piano.
      The subordinate:
         Showed slides of the subordinate theme.
         Played and had pupils sing or hum it.

Asked children to listen and observe the following:
1. The principal theme closes with a definite perfect cadence. (Illustrated with slides.)
2. The subordinate theme—of equal importance to the principal theme and invariably presented in a different key. (Illustrated with a slide.)
3. Codetta usually heard as concluding theme.

II. A manuscript was prepared by the teacher and read to the class.
1. The life of Beethoven. Children were assigned story and the viewing of the film "Life and Loves of Beethoven"[1] before coming to class, and were able to add many interesting anecdotes in connection with the life of Beethoven. The slides of Beethoven's life were shown and discussed. (Children are extremely interested if the pictures show the early life of the composer. It is important to make the composer alive, and not to mention dates of his birth and death at this time.)
2. The part played by Napoleon Bonaparte and the admiration Beethoven had for him. Showed slides of Napoleon and discussed the history of this period. Discussed the effect of the time on Beethoven's music—major and massive chords.
3. Played *Symphony No.* 3 of Beethoven on Victrola.
   As numbers were played showed slides containing principal and subordinate themes.
   Repeated humming of themes.

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[1] Garrison Film Distributors.

Pupils copied themes (melody) from the slides into the music notebooks.

III. Conclusion. The Poem "Beethoven," from "Music Notebook" by Lilian Van de Vere, was shown by means of slides.

AVIATION CLUB ACTIVITIES[1]

Upper Grades

Flat pictures, maps, bulletin board, models, trips, films, slides

Several large colored pictures of airplanes and a large wall map of important world air routes (free from H. J. Heinz Company) placed on the bulletin board one day aroused the interest of the group. An aviation club was organized and a part of the school room became the Midwest Airliner Hangar. Books of every kind related to aviation were collected for the aviation library. These books were read during literature and free reading periods at school and during leisure time at home.

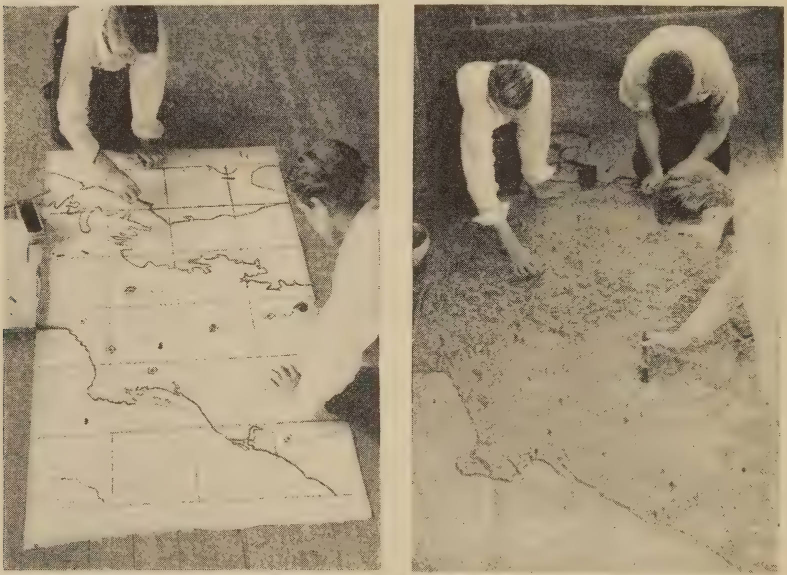

Fig. 84.—As a part of a unit on "aviation" these Burbank, Calif., students are constructing an illuminated relief map showing air routes, beacons, and intermediate landing fields.

Pictures of planes, equipment, flying fields, factories, aviators, and everything related to air activity were collected for a scrapbook. News items were posted on the "airways" bulletin board.

One section of the hangar became a factory for the building of model planes—shelf and flying types. Models of many planes were constructed. Later the flying models were tried out in a near-by open field.

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[1] By Frieda Zimmerman, Washington Grammar School, Washington, Mo.

Kodak pictures were taken of the planes, hangar, and various activities of the club. These pictures become a part of the permanent record of the aviation club.

An air-view map of the local town became the property of the Aviation Club. The Aviation Club, through the courtesy of a local pilot, initiated a trip to Lambert—St. Louis Municipal Airport. The school bus provided transportation. At the airport the club saw:

1. Many and varied types of planes.
2. The control room of the airport.
3. Landing, refueling, and take-off of transcontinental planes.
4. Parachutes and their manipulation.
5. Hangars of visiting planes.
6. Hangars for assembly and repair of planes.

Club members had rides in planes. Pilots explained instrument panels. The members secured information concerning training for aviation officials and pilots.

For several club meetings films of related interests were shown. These films included mineral and manufacturing processes, geographical features along air routes, and adventures in related sciences.

The club now subscribes for two aviation magazines and continues designing and building model planes.

Lantern-slide programs (slides made by club members) have been presented to social-studies classes.

At present the Club is planning to make a moving-picture film of its club activities for school presentation.

EGYPTIAN ART[1]

Upper Grades

Films, film strips, slides, flat pictures, stereographs, objects, newspaper articles

A. Objectives:
  1. To understand the people of Egypt as human beings.
  2. To develop an interest in the art and architecture of Egypt.
  3. To better appreciate the efforts of the Egyptians by illustrating or reconstructing a replica of some Egyptian object.

B. Preparation:
  1. Outline essential points to be developed in the lesson.
  2. Select visual aid which will develop these points with the idea of providing materials
    a. Suitable for use in group discussion.
    b. Suitable for individual study.
    c. Capable of being shown in three dimensions where necessary.
  3. Provide real experience through the use of actual objects or models.

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[1] By Elizabeth G. Hukill, Englewood Junior High School, Englewood, N. J.

Materials used:

1. Film, "Road to the Pyramids" (Eastman).
2. Film roll, "Life in the Desert" (Eastman).
3. Slides.
4. Post cards and other opaque pictures suitable for projection.
5. Stereographs of the Sphinx, pyramids, etc.
6. Egyptian specimen case containing miniature statues, linens, beads, etc., (from State Museum).
7. Collection of Egyptian objects, wall hangings, pillow covers, mummy beads, vanity case, masks, etc.
8. Newspaper articles.

C. Procedure:

1. Introductory discussion about Egyptian people, and their beliefs and superstitions concerning mummification and reincarnation.
2. Teacher presentation of the following materials through use of projected pictures and slides:
    a. Articles:
        Pyramids.
        Pylon temples.
        Influence on modern buildings (Bonwit Teller, New York City).
    b. Sculpture:
        General characteristics of the Sphinx (formation and history).
        Rameses II, Collosi, King Tutankhamen and others. Mask of Egyptian heads.
        During the discussion make rough sketches of the various items. Pass around unbreakable objects from the Egyptian specimen case. Study these items in detail.
        Use stereographs of the Sphinx and pyramids for individual study.
        Show the film, "Road to the Pyramids." Class discussion before the presentation. List questions on blackboard for pupils to answer from their observation of the film. Show twice for slow classes, once for faster groups. Give a written test to determine the extent of their understanding of the film.
        Study, at first hand, samples of the arts and crafts of early Egypt.

D. The assignment—craft activities:

Following a detailed study of the above-mentioned samples, have the pupils select group or individual projects.

Suggested group projects:
    Replica of pyramids on desert (clay modeling, etc.).
    Interior of a tomb.
    Puppets.

Individual projects:
    Plasticine models of Sphinx.
    Soap carving.
    Papier-mâché model of Egyptian head.
    Costume study; dress puppet or doll.

Design modern costume jewelry based on Egyptian designs.
Study modern clothing design and relationship to Egyptian.

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CHAPTER XIII

USING AUDIO-VISUAL AIDS IN THE HIGH SCHOOL

Nearly all that was said at the beginning of the previous chapter in comparing upper-grade and lower-grade pupils holds equally true for the present section. High-school students are more mature than upper-grade pupils; they have had more experience, both inside and outside the school, with individuals, places, things, events, and ideas; they read more extensively; get about more; are allowed more freedom; and think more clearly. Consequently, they are even more competent to appreciate the purposes and contributions of the aids, and so to use, interpret, and apply them more beneficially. Naturally, the aids are more complicated in form and broader in purpose.

High-school work is specialized, and this specialization represents both a real danger and a real opportunity. It represents a danger if the student is not led to broaden the lessons and the applications of material, and it represents as opportunity fittingly capitalized if he is so led. For instance, a high-school trip may justifiably have several supplementary or minor purposes in addition to the one major objective—purposes that relate it to other academic fields and activities. Similarly a motion picture, a radio program, or a set of slides can in many instances help the student to comprehend and appreciate ideas, principles, movements, and reflections that concern other fields than the one under immediate examination or discussion. The teacher, of course, must accept responsibility for this integration.

Further, in the use of these aids in the high school there is more of an attempt to arouse curiosity and less of an attempt to satisfy it completely than there is in the elementary school. Perhaps the mind of the high-school student is not more active than the mind of the elementary-school pupil, but at least it is capable of reaching out farther, of organizing better, and of interpreting more accurately; therefore an important function of the use of audio-visual aids in the high school is to arouse curiosity about extensions, other applications, and further developments that intrigue to continued and additional mental activity that is pertinent. An aid that completely satisfies a felt lack and does not incite to this additional pertinent mental activity is an aid that has been incorrectly and incompletely utilized.

AMERICAN LITERATURE[1]

Maps, dramatization, records, pictures, motion pictures, exhibit, photographs

For a number of years the writer has conducted classes in American Literature and found that the colonial age was less interesting to students than were the other divisions of this field. This year the audio-visual aids indicated below were used, and the results were much more satisfactory.

1. A pictorial map of American Literature.

This map was placed on the bulletin board at the beginning of the course. Frequent references were made to it. The students easily associated names, places, and faces. The work was more interesting. (This map may be secured from The Palmer Company, 370 Atlantic Avenue, Boston, Mass. Price, $1.00.)

2. Frequent but brief dramatizations.

Students took a real delight in the dramatizations of Puritan and colonial scenes. Such work was correlated with the Dramatic Art projects. These scenes were very realistic and educational. The Puritan kitchen scene is a concrete example.

3. Correlation of classwork with social life.

A certain amount of classwork was correlated with social life. The colonial tea scene is a good illustration. Teas are often given anyway in connection with school life. Why not a colonial tea instead of the usual one?

4. The presentation of portions of plays indicative of the period under study.

It is well to keep in mind that plays need not always be presented in costume or in their entirety. For example "Lantern Light" (published by Samuel French) is very characteristic of witchcraft. A few scenes read from it, allowing students to take the different parts, made the witchcraft period much more realistic. The little sketch "The Selectmen of Plymouth Meet" (found in *The Instructor*) shows very clearly the duties of Bradford, Winthrop, and other selectmen. Former days need not be studied in terms of abstract reviews.

5. Correlation with Music and Art.

The class was very much interested in attempting to sing a few of the old psalms as found in the old "Bay Psalm Book." Victor records such as "Spinning Song" (V13153), "Merry Wives of Windsor" (V35764), and "Country Gardens" (V20642) are very characteristic of the period. Such pictures as "Departure of the Mayflower" and "The Gleaners," are typical of possible art correlations.

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[1] By Lulu Spilde, Director of Extension, Southern State Normal School, Springfield, S. D.

6. Picture-recognition tests.

At regular intervals pictures were used for identification. A student chairman or the teacher made the selections, covered the names of the pictures, prepared a key, and gave the tests to the class. The Perry Picture Company[1] publishes suitable pictures (price 2 cts.) in the field of American literature. This test idea is definitely educational and it is intriguing to a class.

7. The use of motion pictures.

Several motion pictures were shown, such as the familiar "Yale Chronicles of America," which illustrated life in the Jamestown Colony. It should be kept in mind that motion pictures must relate specifically to the topics under study, and be not used as an irrelevant entertainment. Preparation of pertinent topics should be made in advance of the showing, and class discussion should follow it.

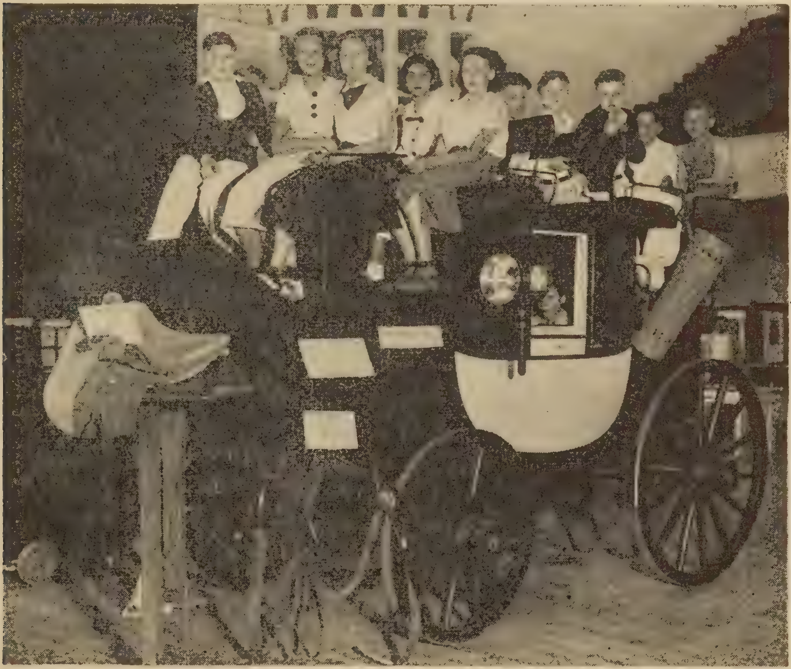

FIG. 85.—An imaginary ride in this tally-ho helps these students of the Burnett Junior High School, San Jose, Calif., to visualize earlier methods of transportation.

8. The student collection of significant pictures.

Many pictures are available to illustrate this period. In order to understand the literature of a people it is necessary to understand and appreciate their intimate surroundings. Such pictures may be bought, collected from free sources, and found in magazines, newspapers, road maps, chamber of commerce booklets, etc. Student project books are interesting. The writer's class found about 700 free pictures which would otherwise have reached the wastepaper basket in due time. Pictures of homes, furniture, musical instruments, vehicles, boats, streets, and social life, make the age much more realistic.

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[1] Malden, Mass.

9. The exhibit.

The final collection of booklets, pictures, photographs, maps, and other material was organized as an exhibit which was not only shown locally but also taken to a state teachers' meeting. Increasingly, schools are exchanging exhibits. This may easily be done in the field of literature. Naturally, the exhibit creates interest and also rewards the class for its voluntary projects.

10. Photographs of projects.

The students developed an interest in the photography of their individual projects as well as their joint exhibits. The arrangement of materials for such photography necessarily calls for a more intimate study of the age. The results of their own work—reading, research, collecting, and creative projects—make the period more significant to the students.

As a result of the use of these ten devices the students manifested: (1) additional interest; (2) a greater understanding and appreciation of the period than otherwise would have been possible; (3) a continued interest after the course closed; and (4) initiative in discussing and illustrating, before school and community clubs, the colonial period of literature. This last activity was promoted by the student speakers' bureau.

A VISIT TO THE NEW ENGLAND CAPES[1]

Trips, slides, pictures, films, drawings, posters, charts, maps, exhibits

Objective: To give the students a better understanding of the New England Capes, the people, and their industries.

Lesson I: Picture—Gloucester, Mass., waterfront.
Slide—"Half-Moon Beach."
Slide—relief map of the New England states.
Outline of the topic—developed by group, written on the board.

I. Introduction:
  A. A study of capes: definition; location; importance.
II. Industries of the New England capes:
  A. Fishing:
    1. Kinds of fish caught.
    2. Location of the fisheries.

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[1] By Paul T. Williams, Ballston Spa, N. Y.

   3. Methods employed in catching fish.
   4. Preparation of fish for market.
   5. Chief centers of the fishing industry.
   6. The fishing season.
   7. Importance of fishing.

B. Shipbuilding: history; resources available; economic value.
C. Agriculture: types; reasons for each of.
D. Tourist trade: hotel and cottage; artist colony; miscellaneous.

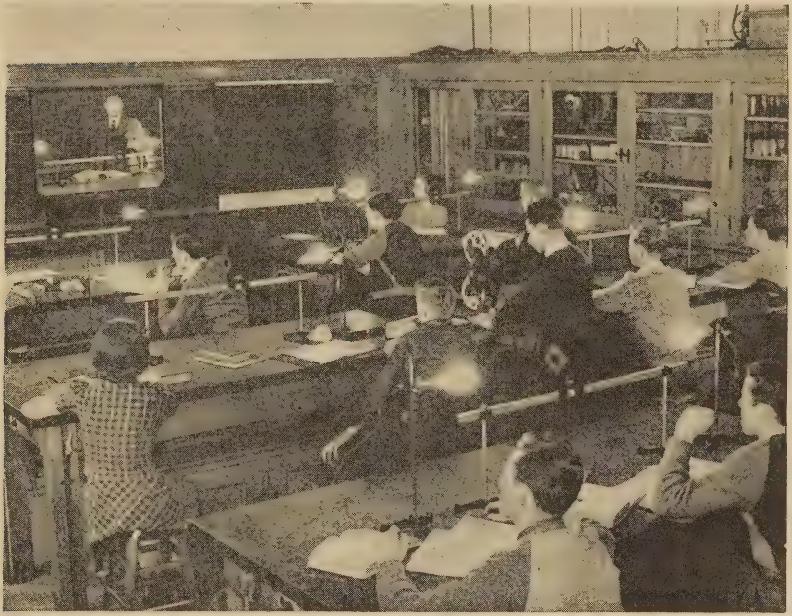

FIG. 86.—These students are watching a motion-picture demonstration of an experiment before performing it themselves. (*Courtesy of Bell and Howell.*)

III. Geographical and historical points of interest:

A. Bass rocks.
B. Dog Town commons.
C. Rockport granite quarries.
D. Norman's Woe.
E. Fisherman's memorial.
F. Art galleries.
G. Cod fishing plant.
H. Sand dunes.
I. Essex shipyards.

LESSON II–IV: Research period. Trip to Saratoga Springs for bulletins, pictures, circulars, and exhibits.

Groups were formed and reference material—textbooks, maps, pictures, slides, and charts—were assigned to each group. Each student selected those suitable for his own topic. A number of students made their own aids.

LESSON V–VII: Recitation period. Student presentations followed by teacher and student discussions.

I. Introduction: slide map of New England States.
   Physical map showing route from Ballston Spa to New England capes.
II. Main Industries of New England States:
   Pictures: early colonists; Old Cape Ann.
   Student sketch: sawmill of 1628.
   Slides: harbor of Gloucester; "Codfish Packing"; "The Artist at Work"; "An Artist's Study."
   Handmade slides: a fishing schooner; a quarry.
III. Geographical and Historical Points of Interest.
   Student sketch: "The Cape Ann Trail."
   Pictures and slides.

LESSON VIII–X: Summary. Showing boats, views, methods, memorial services, etc.
Films: "Cod" and "Mackerel" ("The New England Fisheries" series).

Test: Completion and essay questions.
Final Checkup: The films were shown again, false impressions and misunderstandings were corrected, and correct impressions were stressed.

RECENT EVENTS IN GERMANY[1]

Motion pictures

Purposes of the lesson:

1. To show the influence of the Rhine in German history.
2. To illustrate the relationships of Germany with the rest of Europe.
3. To show how the recent history of Germany has its roots in the past.
4. To indicate the change in Germany's attitude toward the rest of the world.
5. To provide the class with a summary of events which have occurred since the text was published.
6. To analyze the progress of democracy in Germany in recent times.
7. To indicate how the rest of the world looks upon Hitler's career.
8. To sketch the events in the history of Germany which made Hitler's career possible.

Presentation:

1. The day before the films were shown, a list of questions suggesting the above points was written on the blackboard and discussed by the class.
2. Two films were shown: "Historic Rhineland" and "Germany Enters Austria."
3. A general class discussion of the films.
4. A written exercise reflecting points raised in the previous lesson.

[1] By Dorothy Nutzhorn, Englewood Junior High School, Englewood, N. J.

5. A formal written checkup. Illustrative of the questions reflecting the content of the film are the following:

Part I

1. Which were the first troops shown in the picture?
3. Where were the British troops stationed?
6. What treaty ended the allied occupation of the Rhineland?
7. What city was of great strategic value to the French?
8. What was the first known tribe to occupy the Rhineland?
9. What tribe drove out the original inhabitants?
11. What person led in the rearmament of the Rhineland?
13. What quotation summarizes Hitler's idea of the way to rule?
15. Through what pass did the Germans invade Austria?
18. How did France feel about the invasion?
20. What stand does the United States take?
23. What are many nations doing regarding armament?
24. Does military preparation indicate a step forward or backward in the progress of civilization?

Part II

Write a complete paragraph about any five of the following questions:

1. Why did foreign armies occupy the Rhineland?
2. What was the purpose of the Locarno Pact?
3. What nations have ruled the Rhineland? Describe briefly how they gained control.
4. Why is the rise of Hitler, and his remilitarizing, important?
6. How did the leading nations feel about Hitler's invasion of Austria?
8. Has democracy advanced in Germany since 1871? Reasons?
10. What methods does Hitler use to influence people?

LIFE IN RUSSIA[1]

Pictures, photographs, dramatization, records, films, costumes, maps

Time—Six weeks

Objective: To help the students understand the viewpoints, customs, habits, activities, and characteristics of the Russian people.

Initiating the Project: Use of the three-reel silent film "Russia," by Julien Bryan.[2]

Informal discussion of the film and its representations.

General discussion of our aims, materials, possible approaches, organization, and final program.

Suggested organization of class.

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[1] By Clare Symonds, Senior High School, Quincy, Ill.

[2] Department of Visual Instruction, University of Iowa.

Procedure: The class was divided into groups on the basis of the students' interests, each group being responsible for a particular phase of the topic.
Class presentations of all types of material.
Selecting and improving presentations for final program.
Film, "Harvest Festival."[1]

Material Used: Books and periodicals for illustrations, informational material, songs, dances, and costumes:

"Music Highways and Byways," Osbourne, McConathy, and Others, pp. 25–33.
"Folk Costumes in Europe," Kathleen Mann, vol. I, pp. 99–109.
"The Folk Dance Book," C. Ward Crampton.
"Folk Festivals for School Playground," Mary Effie Shambaugh.
Readers Guide.
National Geographic Magazine.

Film strips and slides made by last year's class.
Film strip showing views in European Russia.[2]
Relief maps of Europe and Asia.
Slides: "Interesting Peasant Folks in the Street of a Rural Village," "Exporting Wheat at Odessa on the Black Sea," "Fishermen of the Volga," "Boarding a Train at Kansk," "Siberia—Russian Emigrants," and "In the U. S. S. R., a Land of Many Races and Many Languages."[3]
Victor folk-song records to supplement "Music Highways and Byways."
Costumes. Seven alike for group dancers; also single costumes. Material out of which to make others.

Final Program: This, a composite of all our discoveries, was presented in the classroom at the regular class period. The setting was designed to represent a home in Ukrania where the young people gather for an evening of fun, an event which they call "Vechernitze." All members of the class were appropriately costumed. Invitations to the program were sent to the parents. Mimeographed programs were used. Each number of the program was explained by one of the students before it was presented. The following are illustrative of what was presented:

One group sang, "In My Garden There Is a Hazel Tree" and "Peasant's Vesper Song."
Another group danced the "Hopak" to the accompaniment of a song sung by still another group.
A boys' quartette sang "The Volga Boatmen."
Exhibition and explanation of a handmade Russian flag.
Several other activities were represented. Every member of the class participated in the program in one way or another. The teacher took photographs of the various groups to be used in motivating future classes.

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[1] University of Wisconsin, Madison.
[2] Spencer Film Strip from Society for Visual Education, Chicago.
[3] Keystone View Company, Meadville, Pa.

THE USE OF FILM DIALOGUE IN LANGUAGE TEACHING[1]

The values of foreign films for modern language classes have been so well established that discussion can now be limited to particular techniques of presentation. These are, of course, necessarily governed by the purpose for which a foreign film is shown. These films may be used for (1) dialogue practice in conversational skills, (2) the presentation of material for building up background and association, and (3) for teaching a foreign literature.

The use of film dialogue for practice in conversational skills fulfills a function which few activities of the language class have yet been able to supply. Sometimes we hear a child say, "I am going to Europe with my parents next summer so I must learn to speak well," and to find that his interest needs no further artificial prodding and remains high for an entire ten months. But for the child or even the older student who is not going to Europe in the immediate future, every help must be employed towards obtaining a permanent and satisfying motivation for learning a foreign language. This is where a talking film can do more than any other medium, considering the time and expense involved. The student is confronted with a change of environment sufficiently forceful to challenge his reactions as authentically as if he were suddenly dropped into a German backyard and abruptly asked the password for admittance to the club. However, if experiments in the use of prepared dialogue are to have any permanent value, they must be conducted with films that gain the respect of the student audience for technical excellence. A tiresome first experience with this type of activity would seriously affect the possibility of further interest.

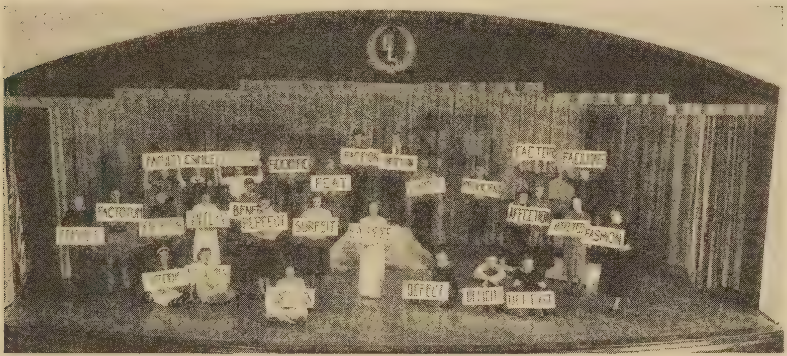

Fig. 87.—A visual representation of some of our common words that come from Latin.

Short selections of the dialogue of "Emil und Die Detektive" were edited by William Kurath, then of the University of Chicago. The dialogue was purposely abridged so that its preparation before the film was shown could take anywhere from one class period to two weeks' intensive drill, and yet the cost to each student would remain nominal.

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[1] By Marie Zoe Greene, Department of Education, Art Institute, Chicago.

Henry Holt and Company published the entire script of "Merlusse" by Marcel Pagnol, noted French playwright and film producer, and edited by Lucius G. Moffatt of Syracuse University, a project which has been in preparation for some time. With a long background of teaching in the lycées of southern France and in Paris and much literary experience, it has been Pagnol's conviction that film scripts should have as high a literary quality as the written drama and should deserve publication as such. The script of "Merlusse" was first published in France in 1935 in *La Petite Illustration.* The school edition is a reader of 117 pages with illustrations from the film. Because of content and cost a reader of this length is usually apportioned to at least several weeks of work in the student's program.

There is probably need for much experimental research before the satisfactory proportion of written material to film is settled in such a way that the visual and aural elements retain the primary emphasis. Most film distributors however will send dialogue sheets upon request and from these the individual teacher can prepare her own classroom material. This is especially important when the choice of a film has been based on its cinematic value.

Critics, on the whole, agree that a film is apt to suffer if it is originally conceived from any other than the purely cinematic point of view. Of course, the filmed play has a place of its own in certain programs. Although the acting of the children is not at all as successful in "Merlusse" as in "Emil und die Detektive" or in "La Maternelle," the atmosphere is accurately rendered. As one British reviewer puts it, "This is a real lycée—the hollow corridors, the playground, the dining hall, the classroom, the bare dormitory are absolutely authentic; one is almost aware of the peculiar smell which such places invariably give out." It is to be hoped that the future creation of sound film primarily for language classes will lie rather in the direction of the universal child classic than in any other.

Suggested Films (16 mm.):[1]

"La Kermesse Héroïque": French dialogue. Recommended for mature classes. (International Film Bureau, 59 E. Van Buren St., Chicago.)
"La Maternelle." (French Motion Picture Corp.)
"Á Paris," "La Champagne," "Les Canaux" ("Shorts," International).
"Merlusse": French dialogue. (French Motion Picture Corp.) 126 W. 46th St., New York.)
"Razumov": French dialogue. Story by Conrad. (Garrison Film Distributors, Inc., 1600 Broadway, New York.)
"Emil und die Detektive." (International.)
"Singende Jugend": Austrian-made, German dialogue. The Vienna choir boys singing and at play. (International Film Bureau.)
"Tsar to Lenin": Russian history, 1912–1922. English narrative. (International Film Bureau.)

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[1] See also Bond, O. F., "Fifty Foreign Films," University of Chicago Press, Chicago.

"The Wave": Mexican. Photographed by Paul Strand; Spanish dialogue. (Garrison.)
"Spanish Earth": English narrative. Best of the several films on events in Spain. (Garrison.)
"The Golem": French and Yiddish dialogue. (Not now on 16-mm. stock.)

"THE MESSIAH"[1]

Records, trip

The aims of this lesson are (1) to familiarize the students with the oratorio as a musical form; (2) to explain the various types of voice quality; and (3) to acquaint the students with a few selections from this particular oratorio.

Teacher: Today we are going to study a musical form which developed from the old miracle plays which were used in the church as an aid to teaching the Scriptures. The churchmen first produced this new form of music in a part of the church called the oratory, and from this came the name, oratorio. It is a religious musical piece composed of recitatives and arias alternating with choruses. You recall that a recitative is a sort of nonmelody recitation in declamation style, and an aria is an elaborate melody sung by a single voice. An oratorio is presented as a concert without action or scenery.

Handel was an outstanding composer of oratorios and his "Messiah," probably his best known, is an oratorio depicting the prophecy, the birth of Christ, the crucifixion, and the resurrection. It has been widely presented by community groups, usually at Christmas time.

The four soloists in this oratorio are a soprano, an alto, a tenor, and a bass. Each of these has several solos, as well as a part in a short quartette selection. First we shall hear an aria sung by a soprano voice. There are various types of soprano voices—the coloratura, a voice which is very flexible, enabling the singer to execute extremely fast and difficult passages; the lyric, which has more depth than the coloratura; the dramatic, which is less flexible but has a deeper tone; and the mezzo-soprano, whose range lies between that of a soprano and an alto. A popular soprano aria from this oratorio is, "I Know That My Redeemer Liveth." Listen carefully and see if you can determine which type of soprano voice sings it. (Teacher plays Victor record No. 9104.)

The lowest woman's voice is the contralto or alto, as it is often called. This will be represented by the aria "He Shall Feed His Flock." As you listen, note the difference in the range and quality of this voice and the soprano you just heard. (Plays Victor record No. 4026.)

The tenor is the highest man's voice. It is this voice which opens the oratorio with a recitative "Every Valley Shall be Exalted." Note the lightness of this voice, and its clear tone. (Plays Victor record No. 12598.)

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[1] By Geneva Scudder, Gilson, Ill. This lesson constituted a part of the preparation for a trip by the class to a neighboring city where the oratorio was heard in its entirety.

The lowest man's voice is the bass. A popular bass number from this oratorio is "Why Do the Nations?" This is an example of a florid aria in which the melody has many decorations. This florid type of singing was used to extreme in the Italian opera. (Plays Victor record No. 9654.)

The outstanding chorus of this oratorio is the final one, the "Hallelujah Chorus." One time in listening to this oratorio the King of England was so carried away by the beauty of this chorus that he rose from his seat. The other members of the audience did likewise. Since that time it is customary for an audience to stand during this number. This chorus is an excellent example of contrapuntal music—music in which we hear two or more tunes interwoven. See if you can hear the various tunes as you listen to this number. (Plays part of Victor record No. 11825, checks on students' reactions, and then plays record in its entirety.)

Somewhat similar activities covered the other phases of the oratorio, in each of which the students were taught "to listen for something," not merely "to listen." Following the trip a class discussion was held and the phonograph was used again several times in clarifying points and emphasizing them.

RETAIL BUSINESS ORGANIZATION[1]

Still film, charts, and advertisements

The still film was used for general presentation, as a basis for class discussion, and as a review device in connection with a unit on types of retail business organizations—a section of the course in elementary business training designed for ninth-grade students.

Aims of the Lesson:

1. To illustrate six general types of retail organization.
2. To show the wide variety of local business organizations of each type.
3. To stimulate thought on the problem of retail organization.
4. To aid pupils to recognize types of retail organizations in the neighborhood.

Preparation:

In the preceding lessons, the class studied types of business activities, both retail and wholesale. As the assignment for the present lesson, the students cut out advertisements of retail stores, and made lists of retail dealers in their own communities. These materials were also used in the following homework assignment.

Plan of the Lesson:

Still films and filmslides were used to guide the class in its discussion of the topic. The first few captions introduced the problem. The succeeding slides classified various retail firms as local independent organizations, chains, branches, sales agencies, department stores, or mail-order houses. The first stores shown were local retail firms—a pushcart being the simplest of illustrations. A preliminary summary was provided by a street scene showing a group of different types of stores to be identified by the students. At various times during the lesson, the teacher turned back to preceding slides for discussion or comparison. The immense organization of a large mail-order house was suggested by a succession of pictures showing sections of a chart of the departmental organization of such a firm.

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[1] By Irving Rosenblum and Charles A. Gramet, Franklin K. Lane High School, Brooklyn, N. Y.

Fig. 88.—If wisely used, the mimeograph is an important piece of visual instructional equipment. Drawings, sketches, diagrams, cartoons, and illustrated text can easily and inexpensively be reproduced on it.

As a summary, a chart was provided using the selling of shoes as a basis for recalling the six types of retail organization indicated above. Additional illustrations concerned the sale of automobile tires, clothing, radios, and other articles suggested by the students. The final slide raised the question of evaluation of the different methods of organization.

The homework assigned was a continuation of the preceding lesson. The students were asked to use their advertisements and store lists and to classify the concerns under the six columnar headings of retail business organizations. The following day this homework served as a review for the film lesson and was used in the preparation of a blackboard summary.

TYPEWRITING[1]

Motion pictures

Progressive teachers are relying whenever possible upon demonstration to replace the wordy explanations which have too often been customary in the past. Motion-picture demonstration of correct technique removes the difficulty sometimes encountered by the teacher who is not sufficiently skilled in her own performance. Another advantage in motion-picture demonstration is that of analysis of technique. If the teacher demonstrator writes at the more rapid rate which is the goal of the beginning typist, her fingers may move too fast for the student to realize how it is being done; if she slows down to a rate that shows the action, she is liable to write as she thinks the technique should be rather than as it actually is. By using slowed-down demonstrations of finished techniques performed at normal rates and under normal conditions the learner can easily see and analyze for himself the details of correct performance.

The motion-picture film "Teaching Beginners HOW to Typewrite"[2] is approximately 400 ft. in length and can be shown in about 20 min. When it is used for lectures before teacher training classes, the whole film is reviewed at one time. When used for instructional purposes in the classroom, it is advisable to show only parts of it at a time.

Section I of the film shows three "shots": In the first, the secretary prepares to typewrite a letter—correct insertion of paper is shown, and margin and tabular stops are set. "Shot" 2 shows the typist typewriting a letter. These facts are evident: (1) the correct sitting position is comfortable, (2) the writer watches her copy, (3) the notebook is in the proper position, (4) the use of the copyholder prevents eyestrain, (5) the paper release lever is used to release the paper. "Shot" 3 shows the letter completed.

Section II boldly shows "How not to do it." This "shot" is in direct contrast to the preceding one. In addition to the general instability of the execution, there are many things about it which should be called to the attention of the students, such as the poor sitting position; the notebook on the wrong side of the machine; the lack of smoothness and rhythm in the writing; the time wasted by the excessive movements of the hand and arm; and the lack of confidence and control. While it is generally considered bad psychology to show the wrong way to do anything, this "shot" in direct contrast to the first emphasizes the right way and is therefore really functional.

Section III shows the beginner the details of correct stroking. Arched fingers, quiet arms, and individual finger stroking are illustrated very clearly. The stroking of whole words as one stroking pattern with complete relaxation after each word is beautifully illustrated and demonstrated.

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[1] By Eleanor Skimin, Northern High School, Detroit, Mich.; Editor, *Business Education Digest*.

[2] By Eleanor Skimin, produced at State College of Washington, Pullman, Wash.

Section IV analyzes the technique of proper shifting for capital letters, carriage returns, and correct hand positions. Students can readily note the ease with which the shift key is used and the fact that it is a hand and not an arm operation. Points of technique are perfectly demonstrated: stroking is quick, sharp, and resilient; wrists are kept steady; hands are not rigid but relaxed, and they stay close to the basic position.

All or part of this may be shown according to the lesson to be presented. A complete showing of the film from time to time is advisable in order to maintain interest in the development of good habits. The motivation that comes from the showing of a motion-picture film is apparently much greater than that which follows any teacher demonstration or lecture. To be sure, the teacher must be there to direct the class in correct interpretations.

An Illustrative Lesson With the Aid of the Motion Picture

The first day's lesson in using the shift key and the writing of the sentence "They were trying their best."

Our work today consists of learning how to make capital letters properly. I am going to show you a motion-picture film of a very good typist performing this operation, just as you will do it.

The hands in the picture are very much enlarged so that you can see exactly how the typist used them to do good work with such complete ease, control, and rhythm. The first exercise is repeated several times, so that you may get a clear picture as to just how the fingers move. The fingers in the picture are stroking the letter *j* four times, then the little finger of the left hand merely reaches over to the shift key, holds it down with a mild degree of force while the letter *j* is struck again (this causes the type to make a capital letter), the left hand returns to its basic position immediately after this stroke is completed, and just as this operation is completed, the right strokes another *j*. This is what is written: jjjjJj jjjjJj jjjjJj.

Now that you have seen this done we will attempt to do likewise. Hands in position and when I say *j* four times, shift *j*, *j* pause, you will try it. Now I'll turn out the lights and show the picture; try the operation while the room is dark, for typewriting is done by "feel." After we can take care of the letter *j*, we will try the same procedure with *f* and *t*. This time we will use the little finger of the right hand to hold the shift key.

You have noticed that the holding of the shift key is done with the little finger and that it must be held all the way down while the letter is being struck. You have noticed, too, after the shift operation that the hand returns immediately to its basic position.

Now, will you observe the writing of the word "They." This is a word that appears often in all writing, and one that lends itself to smooth and rhythmic writing. Please notice the hands in the picture. They seem to anticipate the whole word before it is written. The slow motion will show you just how the fingers reach for the keys. In the sentence for today there are three flash words, "they," "were," "their." The word "trying" has the common ending "ing" on which you have worked before. The hands in the picture show you HOW to write this sentence. Your own careful practice will enable you to do it very well. We shall continue with the practice of this sentence tomorrow, but without the film. Try to remember all these fine points of technique because we will have a short discussion of them at the beginning of class.

CURRENT EVENTS[1]

Films and current-events literature

Problems are set up for the entire semester and correlated with news events as they occur. Checkups are used at the end of each six-weeks division. Emphases are upon causes and effects. The problems scheduled for the second semester, 1938–1939, were: Poverty, Unemployment, Our High Accident Rate, War—International and Civil, Labor Problems and Disputes, Conservation, and Speed with Which Changes Occur.

Illustrative Weekly Schedule: March 20–24.

Monday: Read current events. Two main articles were the complete breakdown of Czechoslovakia, and peace plan studied by the A.F. of L. and the C.I.O. The place and value of citizenship were featured.

Tuesday: Discussion, following chronological sequence of Germany-Hungary relationship between acts and international strife—the possible causes of war.

Wednesday: Report on basic cause for dispute between A.F. of L. and C.I.O. (*Newsweek* magazine). General discussion of accidents. Germany's invasion of Austria, Hitler's birthplace. Germany's need of wheat and oil.

Thursday: Films: "German Invasion of Austria,"[2] "Through Oil Lands of Hungary and Rumania,"[3] and "Along the Danube River."[3]

Friday: Discuss films. Reshow sections about which questions are raised. Point out differences between Germany's needs and Hitler's wants; the difficulty of absorbing anti-Nazi groups like Bohemians and Moravians; and how the traditions, habits, customs, and environments of peasants and masses make Hitler's moves possible.

GERMINATION AND GROWTH OF PLANTS[4]

Motion pictures, lantern slides, handmade slides, charts, graphs, microscope, and experiments

General Assignment:

1. Study pages 115–133 of the text (Hunter, "**Problems** in Biology"). This material will be supplemented by lectures, discussions, demonstrations, experiments, slides, and motion pictures.

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[1] By Donald Brumbaugh, Fruita, Colo. Every Friday the group sees a newsreel at the local theater. This material is worked into the regular lessons.

[2] Castle Films, Chicago.

[3] U. S. Bureau of Mines.

[4] By C. J. Koenig, Scarborough School, Scarborough-on-Hudson, N. Y.

2. Complete the exercises as directed in the workbook.
3. Organize the material by constructing a summary outline of the unit's work.

Presentation:

The main purpose of this unit of study is to show how a baby plant, or embryo, grows into an adult. Seeds, as we learned in a previous unit, are formed in fruits as the result of the pollination of flowers. Seeds may, for long periods of time, remain dormant, then suddenly show signs of life. This activity is due to a stimulus of some kind. Obviously some conditions both inside and outside the seed start the growth of the plant. We are, then, interested in finding out just what these conditions that start and maintain growth are. By experimentation we shall find the answer to this problem. Then, too, plants must obtain food in order to grow. The fact that seeds do contain food materials of various sorts is evident when we think that we eat such seeds as peas and beans. We shall then make a comparison of the manner in which foods are used by plants with the way in which we use the same substances.

Assimilative Material:

Among the problems to be solved in this unit are the following:

A. Where are embryo plants found?
  1. The study of seeds:
    a. Firsthand study of bean and corn seed.
    b. Keystone Biology Lantern Slides:
      6—Seed Coats
      8—Embryo of Corn and Bean

B. How can we find what nutrients are present in seeds?
  1. Test for starch:
    a. Microscope study of crushed bean seed stained with iodine.
    b. Study of colored chart of starch test.
  2. Test for proteins:
    a. Test carried out by each student.
    b. Grease spot on paper projected to show it is translucent. Study of Langworthy Food Charts Nos. 6, 10, 13, 14, showing by visual means percentages of starch, proteins, and fats in various seeds.

C. What factors are necessary for germination?
  1. Water: Demonstration showing failure of dry seeds to grow in dry moss, and successful growth of soaked seeds in moist moss.
  2. Air: Demonstration showing failure of seeds to grow when in a vacuum, and successful growth of seed in container open to air.
  3. Temperature: Demonstration showing failure of seeds to grow when kept in warm oven or in refrigerator, and successful growth when kept at room temperature.

D. How does the embryo become a plant?
  1. Cotyledon; 2. Plumule; 3. Hypocotyl.
    a. Observation and study of bean and corn seedlings at various stages of growth in a germinating box.

b. Study of preserved specimen showing progressive stages of growth of seedlings.

c. Detailed study of film "Do You Know Beans?"[1] showing animated drawings and progressive shots of bean growth.

d. Study of lantern slides showing structure of parts in various seeds. Keystone slides, 8—Development of Corn and Bean, 9A—Development of Corn Seedling.

e. Microscopic study of sections of corn seed.

f. Experiments on effect of removal of cotyledon on growth.

FIG. 89.—A perfect educational setting—one representing ideals, knowledge, and practice.

E. What makes a young plant grow?

1. Proof that oxidation occurs in plants:
   - *a.* Experiment: Testing air in flask containing growing seeds indicating increased quantity of carbon as shown by limewater test.
   - *b.* Demonstration: Expelling air from the lungs through limewater to show pressure of carbon dioxide in human breath.

F. Do plants digest food?

1. Proof that starch is changed to sugar in plants:
   - *a.* Test with Fehling's solution to show evidence of grape sugar.
   - *b.* Demonstration: test dry, unsprouted bean or corn seed for grape sugar.

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[1] Edited Pictures System.

c. Demonstration: test dry, sprouted bean or corn seed for grape sugar.
d. Demonstration: test sprouting bean or corn seed for starch; study specimen under microscope for presence of starch grains.
e. Demonstration: digestion of starch to sugar in test tube by use of diastase.
f. Demonstration: test piece of cracker for grape sugar before and after chewing in the mouth.

The charts and slides are always accessible to the students and in the review of the unit they often independently make use of them to supplement or replace rereading of the text material.

Checkup:

At the completion of the unit a checkup is given to the students' mastery of the unit.

Some of the slides and charts used in the study of the unit are made, or were made, by the students themselves during the assimilative period. This offers a combination of visual and manual expression which is very stimulating to the students gifted in those lines. Too, this opportunity helps to build up a permanent library which is of use to the other students.

SOLVING PROBLEMS IN SCIENCE[1]

Handmade Slides

Many students are "scared away" from science, especially physics, because they feel that they cannot master the mathematics involved. In order to make diagrams and problems more clear and definite, we use slides that we made ourselves. Problem slides are typewritten, diagram slides are drawn, and unbalanced chemical equations are written. The diagram slides represent a great variety of subjects, such as, steam engines, gas engines, pumps, automobile gears, parts of a flower, sections of roots, and chemical apparatus.

A 3″ × 5″ card is filed with each problem slide. On the front of this card is a typewritten copy of the problem, and on the back of it is the solution.

Our problem slides are used in a sort of competitive game. When a slide is shown, the students attempt to solve the problem it presents. As soon as a student solves it he draws a circle around the answer and brings it to the teacher's desk for credit. Students with difficulties may come to the instructor for help. As soon as the first student has completed a problem, the next slide is shown. Students who have not completed the first one continue to work on it until they get it either without or with the teacher's help. The same procedure is followed with all of the problems of the lesson. Obviously, the brighter students may be able to solve these problems at a very rapid rate and so complete all or nearly all of them, while the slower students may be able to work only the first, or the first and fourth, etc. This type of individual competition is stimulating, even to those students who "cannot keep up with the show": we have found that nearly all of the students who do not succeed well in one of these lessons come to the instructor for help outside of class.

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[1] By Robert B. Saylor, Barringer High School, Newark, N. J.

All these slides are kept on the desk where they are available for new-lesson classwork, review, or individual instruction (using the file cards) at any time.

WATER SUPPLY AND WASTE DISPOSAL[1]

Film, bulletin board, graphs, cartoons, handmade slides

In order to try to make the work as lifelike as possible, the H9 classes are organized as a "city," with a mayor, city council, chief of police, judge, sanitary engineer, editor, and other officials, even a secretary of the local chamber of commerce. The contracts are related to this organization.

1. Films:[2]

"Water Supply" "Mosquitoes"
"Water Cycle" "Sewage Disposal"
"Purifying a City's Water Supply"

2. Outside speaker from the East Bay Municipal Utility District.

The Utility District provides a very excellent speaker who comes to the classroom, bringing sound equipment and a fine film describing and demonstrating the various steps in obtaining, protecting, purifying, and using our local water supply.

3. Room Library to Supplement Text Material.

Booklets prepared by the Utility District showing pictures and diagrams of all phases of our own water supply from the Mokelumne River to the schoolroom faucets.

Booklets from Metropolitan Life Insurance Company on the subjects of mosquitoes, typhoid fever, malaria, water-borne diseases, Walter Reed, etc.

4. Bulletin board.

Cartoons pertinent to the contracts or drawn by the students for the "city paper" and exhibited on the bulletin board. The best of these are selected for the class paper.

Graphs showing the progress made in conquering water and mosquito-borne diseases are designed and posted.

Suitable pictures are collected and posted.

5. Handmade slides:

To illustrate any oral reports by the students.

To illustrate points the instructor wishes to emphasize.

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[1] By Dorothy F. Osburn, Westlake Junior High School, Oakland, Calif.

[2] Eastman Teaching Films, Rochester, N. Y.

To show the construction of septic tanks, proper location of a well, dangers of certain springs, etc.

Tests are typed on cellophane, made into slides, and projected.

Contracts

WATER SUPPLY

List all the ways in which water is used in a home. List all the ways in which water is used in a modern American city. Have you any idea of the amount used per capita in Oakland? Find out if you can. Give the reasons why a city needs an abundant supply of pure water. Do you believe the water supply should be publicly or privately owned? Give the arguments on both sides of the question and prepare to debate the matter. What are the usual sources of water supply for a large city? Investigate and give the advantages and disadvantages of each possible source.

COMMUNITY HEALTH PROBLEMS

The rural community near by is also facing the water supply problem. The common sources of rural supply are (*a*) cisterns, (*b*) springs, (*c*) shallow wells, and (*d*) deep wells. Prepare a report for the local paper showing the dangers and advantages of each possible source. The paper has also requested a report on the dangers of water-borne diseases. Prepare this report.

Prepare a diagram or chart showing the main steps in the "water cycle." The Civic City Club asks you to speak on the subject: "When and Where Are Wells Safe?" Write out for the local paper a brief summary of your proposed talk. Prepare a cartoon for the editorial page pointing out the necessity for having pure water for every citizen.

PURIFYING THE WATER SUPPLY

You are to act as city health officer. You know that there are three types of impurities in water: (*a*) dissolved material, (*b*) suspended material, (*c*) germs. Give examples of and explain each of these. What is an epidemic? What are the diseases which often occur as epidemics? How are they often caused? A member of the city council objects to the cost of purification of water, saying that if water is clear and tastes good it is all right. As city health officer, you must accept or disprove his statement. What will you do? Learn how to test for organic impurities and demonstrate results. Learn how to test for dissolved material. Try it. Learn how to remove suspended material.

See the films "A City's Water Supply" and "Purifying Water." Of what use are filters? What do they remove? Why do some cities aerate their water? Of what use are reservoirs and sedimentation tanks in purifying water? What chemicals are added to water? Why?

Why is lime added to Oakland's water supply? What can you do to purify small amounts of water while you are on a hiking trip? How does distillation purify water? Report such an experiment. How does boiling purify water? Investigate and report fully on the methods of purification used by the East Bay Public Utility District. Prepare charts or diagrams showing the methods by which each of the three types of impurities can be removed from water. Why do floods always call for especially careful checking of a water supply?

Waste Disposal

Our city must dispose of its sewage, garbage, and wastes in such a way as to protect both itself and its neighbors from disease. Prepare a report showing the dangers of germs being spread by flies, sewage, garbage, rats, etc.

Draw a cartoon showing "The Journeys of a Fly." We may dispose of our sewage in (*a*) a river, (*b*) a lake, (*c*) ocean, or (*d*) a disposal plant. Investigate each idea and report your recommendations. The rural community asks for information about cesspools and septic tanks. Prepare your report.

Why is rural health important to the near-by city? Show how rural and city communities are interwoven in interest. Prepare a pertinent cartoon.

SOME USES OF THE MICROPROJECTOR IN PHYSICS AND CHEMISTRY[1]

Increasingly the microprojector is being used in high-school science classes. The four main advantages of this device are: (1) it is relatively inexpensive because a single group-used projector replaces a number of individually used microscopes; (2) it presents a greatly enlarged picture of the specimen, object, or action; (3) it can be competently operated by the teacher; a great deal of student-use of the microscope is inexpert to say the least; and (4) it provides opportunity for a very pointed, intriguing, and profitable teaching technique. The following are a few of the phenomena which can be presented by the microprojector:

1. Stress and strain on fibers, filaments, and surfaces.
2. Surface-tension phenomena with films on aqueous and other solutions.

With the use of hanging drop slides and special slides made with a well in the center, soap solutions and oil films of varying viscosity are strikingly projected under low-power magnification as well as high power. By dropping dispersing agents on the surface while in projection the breakdown on the surface films is also shown. Such surface action as the peculiar rotation of salicylic acid crystals provides problem material for the capable student.

3. Brownian movement observation with high power oil immersion projection.
4. Physical examination of wool, cotton, silk, rayon, linen, or other textile fibers.

By lightly staining in carmine, eosine, or other dyes and use of balsam with cover glasses, permanent slides for projection may be made which give excellent results in identification of fibers. Effects of various solutions on fabrics may also be shown as well as laundering effects with soaps and detergents. With use of cross-haired slide or objective, the thread count of fabric samples can be made as projected.

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[1] By Theodore Sargent, Swampscott, Mass. This is an abridgment of a very interesting article under the same title appearing in *Educational Screen* for October, 1938, vol. 17, pp. 259–260.

5. Gross projection of prepared slides showing fingerprints or other print materials which permit light transmission.

Canal patterns of fingerprints project very well. Further application can be made in blood smears and similar investigations which suggest themselves in biological or physiological or pathological examination.

6. Migration of charged particles in solutions.

By constructing a special slide with rectangular well and platinum electrodes connected to a polarized circuit, the migration of charged particles in electrolytes is strikingly shown. By this technique the electric character of charged particles is clear to the student. Use a reversing switch to show changes of migration while being projected and the results are dramatic in effect. Colloidal solutions are particularly well adapted to this work and the student easily grasps the significance of ionic charge and migration.

7. Interference patterns of light.
8. The optical principles of image and object relationship.
9. The optical principles of refracted light and color sense.
10. The gross examination of properties of crystals and other small forms of matter.

With white and polarized light, properties such as opacity, solubility, and refraction of minerals, textiles, ceramics, tissues, foods, paper, petroleum, rubber, paints, liquid specimens, crystals, and many common compounds can be studied if thin layers of material are selected. Starch grains show a dark cross that rotates as the analyzer is turned. This is a standard test for starch in botanical materials.

11. The projection of crystal growths in solutions.

Some suitable and interesting growth patterns are shown in the crystallization of ammonium chloride; sulfur in carbon bisulfide; sodium nitrate; copper sulfate; sodium chloride; potassium dichromate; sodium hyposulfite; potassium chlorate. It is important to show melting under the effects of the heat of the arc beam by moving the cooling cell out of the light path and the subsequent crystallization without changing the field of projection.

12. The growth of crystals in dark-field projection and with polarized light.
13. The Tyndall phenomena in colloidal solutions.
14. All material now available on microscope prepared slides can be projected in the microprojector.

The caution should be made, however, that the beam is cooled to the degree necessary to prevent damage to the material mounted on the slide.

15. Dark-field and opaque projection offers some opportunity.

GENERATING AND USING ELECTRICITY[1]

Trip

This topic presents many difficulties to junior high-school pupils, due to their lack of experiential background in this area, the persistent shroud of mystery surrounding anything electrical, and the difficulty many minds experience in gaining basic concepts through the use of the miniature-model generating devices used in most school laboratories. Fundamentally, the laboratory apparatus and the commercial electrical appliances are identical, but many persons, young and old, fail to see such relationships, and experience difficulty in transferring their "laboratory thinking" to life situation setups.

Fig. 90.—The members of this Hostess Club of the Jarrett Junior High School, Springfield, Mo., are learning through a variety of visual aids.

If, however, a power plant is easily accessible, and a well-planned school journey is taken to the institution, the resulting sensory experiences will form bases for a better understanding of electrical phenomena through the textbook study and the accompanying laboratory work. The trip may serve as an introduction to the unit, or it may be taken at a later point in the study of the problem. The sequence-placement of the school-journey lesson, will, however, materially affect the plans for this activity. The accompanying lesson plan is designed for use after some progress with the work of the unit.

Pupil's Aims

1. To satisfy a natural curiosity about electricity and electrical phenomena.
2. To understand better the problems of generating electricity by mechanical means.

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[1] By Wilber Emmert, Director Visual Education, State Teachers College, Indiana, Pa.

3. To understand better the "vocabulary of the electrician," through a firsthand study of electrical devices, their parts, operation, and uses.
4. To recognize the place of electricity in our daily lives.
5. To appreciate the work of unseen "servants of the people," and our dependence on them.
6. To master more easily correlated science material studied.

Initiating the Journey

In the study of the unit it was discovered that energy transformations may be effected so that electricity may be produced through the use of the static machine, chemical action, use of the dynamo, by means of a thermocouple, and through photoelectric effects. Because the power plant is only a few hundred yards from the school building, it was suggested that the class visit it and secure firsthand information about electricity and electrical problems. Acting upon the suggestion, committees were appointed and plans formulated for the trip. One committee secured the permission of the school principal for the class to make the visit; another called on the superintendent of the power plant, who granted his permission and also co-operated with the group in developing a guide sheet for use during the inspection tour; a third made duplicate copies of the guide sheet and distributed them to members of the class.

Preparation

A picture of the interior of the plant, loaned by the superintendent, served to excite interest and also as an orientation device. A review of a unit previously studied, "How the Energy from Steam is Put to Work," showed the source of power for running the generators, and indicated energy transformations from coal, through heat, steam, electricity, and light. This, together with the study of magnetism, magnetic fields, and magnets gave the pupils the necessary background of basic information. During the classwork on this problem a vocabulary of electrical terms was built up. Considerable attention was given to diagrams of generators, motors, electric circuits, and control devices.

At the Plant

Upon arriving at the plant, the pupils used the guide sheet and proceeded as in any other laboratory period. The teacher, superintendent, and attendants at the plant assisted the pupils when asked to do so. The guide sheet shown below calls for definite recording of certain items, as well as unwritten-up study and observation.

Trip to the Power Plant

Generating and Using Electricity:

The field trip will consume 1 hr.; hence it will be necessary to work rapidly, observe carefully, and record accurately. Make your records while at the plant. Determine to get as much out of the trip as is possible. Make your own records, do your own work. Return to class with a great number of questions.

The trip will involve an inspection of the two parts of the power plant, the electrical room and the boiler room. The major portion of the period will be spent in a study of the electrical apparatus.

On the back of this sheet summarize the trip to the power plant. Hand it in at the next class period.

The Electrical Plant

The source of power:

Locate the steam pipe which leads to the engines.

Study the steam engine. Locate such parts as: the cylinder, piston, flywheel, eccentric, crankshaft, oiling system, the piston rod.

Observe how the engine is connected with the generator.

How many hours per day does the plant run? ________.

How many men are employed? ________ How long shifts do the men work? ________ Are accurate records kept? ________

The Alternating-current Generators

The plant contains (one) (two) (three) (four) alternating-current generators.

The alternators produce (alternating current) (direct current).

What voltage is developed? ________ How many amperes? ________ How many r.p.m.? ________

Locate the field magnets, rotor, slip rings, brushes, outlet for current.

What purpose is served by the direct-current generator on the same shaft as the rotor of the alternator? ________

Read the name plate on the alternator, and on the direct-current generator with the alternator.

The Motor Generators

Locate the motor generator sets. Why are they so named? ________

For what purpose are they used? ________

Read the name plate of the motor and the generator of the motor generator set.

Motor: horsepower (hp.) ________, volts ________, amperes ________, cycle ________, r.p.m. ________, kind of motor ________.

Generator: volts (no load) ________, volts (full load) ________, amperes ________, r.p.m. ________, kind (alternating current) (direct current)

Locate: armature, commutator, brushes, field magnets, cables.

The Switchboard

Of what material is the switchboard made? ________ Why? ________

Observe the various instruments on the switchboard. Take the readings of the ammeters ________, voltmeters ________, watt-hour meters ________, recording meter ________, synchronizer meter ________.

Read the name plates where the cables leave the power house for the various buildings of the campus.

Read the name plates to determine the switches for the various buildings.

The Boiler Room

How many furnaces and boilers are there? ________ How many are used at one time? ________

Note the recording devices. Observe how the coal is taken to, and fed into the furnaces. How is the draft for the fires obtained? ________

How much coal is used per day? ________ For what is the heat used? ________

Note the generous use of electrical devices in the furnace room.

The Ashpit

How are the ashes disposed of? ________

Through the Tunnel

Note the location and arrangement of the steam pipes. The electric cables.

The Distributing Room

What voltage is delivered to the main lines in the distributing room? ________

What purpose is served by the emergency lighting plant? How operated?

Checking the Results

1. Class discussion:

   At the next class hour the discussion was based upon the experiences of the trip.

   From the written summaries on the backs of the guide sheets, important points were stressed and misunderstandings clarified.

   The blackboard was used to diagram some of the circuits, connections, and relationship of parts of the devices.

   The electrical terms previously studied were listed on the blackboard, together with new words acquired during the visit. Attention was given to the correct spelling and pronunciation of these words.

   Several members of the class recounted some of the "side lights" on electricity secured while talking to members of the staff at the plant.

2. The following test was given:

   a. Electricity is generated by a (dynamo) (motor).
   b. The power plant contains (one) (two) (three) (four) alternating-current generators.
   c. The alternators produce (alternating current) (direct current).
   d. The commutator is a part of the (alternating-current) (direct-current) generator.
   e. The motor is run by (steam) (electricity).
   f. The usual house lighting voltage is (60) (110) (220) volts.
   g. The voltage of a circuit is measured by (a voltmeter) (an ammeter) (a watt-hour meter).
   h. The generator of the motor generator set produces (alternating-current) (direct-current) current.

i. The hoists, stokers, draft fans, and coal crushers are operated by (dynamos) (motors).

j. Electrical circuits are opened and closed by (rheostats) (switches).

Correlation

Using the general outline of the textbook, the important points stressed in the school-journey lesson were further studied and amplified. Lights, switches, motors, fuse boxes, fuses, insulators, extension cords, conduits, and light fixtures in the classroom and around the school buildings were noted and studied. These items served as topics for special reports by members of the class, the information being secured from books in the science library and the junior high-school library.

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CHAPTER XIV

ADMINISTRATION AND SUPERVISION OF THE AUDIO-VISUAL PROGRAM

The very nature of the audio-visual program is such that a director is needed, if the program is to operate smoothly and effectively.[1] Because these aids will be used in every grade level, and in practically every subject field, it is necessary that some person supervise and coordinate their use. And whether in a school system housed in one building and employing only six or eight teachers, or in one including several separate buildings and employing hundreds of teachers, the problems of the director remain about the same.[2] In smaller schools the administration of the program is assigned to a teacher while in the larger cities full-time directors are employed. It is trite to remark that in the former arrangement the teacher's regular load should be lightened in order to provide time for the new duties.[3]

Recently one of the authors addressed the faculty of a department in a large city system. During the discussion that followed, one teacher felt that the use of the motion picture in the classroom would be a great help, but stated that he did not think the school could afford a projector. He was informed by one of the other instructors present that the school owned a sound projector, a screen, and memberships in two film libraries. Only a few instructors in this department knew that the school possessed such equipment, and only two had actually used it. In this situation a director would have rendered valuable service even if he had done nothing more than acquaint the teachers of the system with the supply of equipment and materials available.

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[1] Part One of "Motion Pictures in Education," Dale, Dunn, Hoban, and Schneider, is composed of briefed articles classified under the heading, "The Administration of Visual Aids."

[2] In his article, The City Program, *Educational Screen*, vol. 19, pp. 103–104, March, 1940, Alexander Jardine not only describes several types of administration, but also gives statistics on fourteen representative city systems. These statistics include: type of library, system of delivery, frequency of requisition, frequency of deliveries, loan periods, budget, and size of staff. The "size of staff" and "budget" (exclusive of salaries) items in these fourteen cities range from one part-time and $200 in Pueblo to 20 and $68,200 in Detroit.

[3] Four articles pertinent to the small-school and limited-budget settings are: AMBROSIUS, S., The Small School Can Afford a Visual-Aid Program, *School Activities*, vol. 11, pp. 114, 116, November, 1939; BERRY, G. L., A Visual-education Program in a Small School, *School Executive*, vol. 57, pp. 483–484, June, 1938; JONES, G. R., and J. W. GILLILAND, Audio-visual Education on a Limited Budget, *Educational Screen*, vol. 17, pp. 79–81, March, 1938; and WRIGHT, T. R., Developing a Low-cost Visual-aids Program, "Eighteenth Yearbook," pp. 420–424, Department of Elementary School Principals, July, 1939.

The director of the audio-visual program should not be looked upon as a dictator. True he must have the authority necessary to carry on the work of the department, but the success of the program depends upon the cooperation of all the teachers. He must cooperate with them in many ways, because, after all, the materials are purchased with the expectation that they will be used by these instructors. Without this cooperation on the part of the director and instructors, no program, no matter how elaborate, can succeed.

QUALIFICATIONS OF THE DIRECTOR

Because the director of the audio-visual program comes into contact with practically every instructor in the system, and is responsible for the annual investment of a considerable amount of school money it is apparent that he must possess qualifications of a high order. The following are indicative:

1. The director should have administrative ability because he must set up the budget, supervise the clerical, mechanical, and distributive force, coordinate activities, and perform many other duties of this nature.

2. He should be thoroughly acquainted with the methods of using audio-visual aids in the classroom. The instructors and supervisors will naturally look to the director for help and suggestions on the use of these materials. Therefore he should be prepared to give this assistance.

3. He should have a wide acquaintance with the subject matter of various grades from primary through high school. If possible, a person who has had some experience in both the elementary grades and high school should be selected for the position.

4. He should have a clear and distinct understanding of the more important educational objectives and should insist that the audio-visual aids selected be in harmony with these objectives.

5. He should have a thorough knowledge of the problems involved in carrying on the audio-visual instruction program. These problems may range from the selection of simple material to architectural diagrams for suitable projection rooms.

6. He should be mechanically inclined because in many instances, especially in the smaller schools, he will be called upon to operate and make minor repairs on the various types of equipment.

7. He should be personable so that teachers will have no hesitancy in raising questions, making comments, or asking for materials and help. He should not only be able to teach teachers but also be able and willing to learn from them.

Perhaps an individual possessing all these qualifications is rather a rarity. On the other hand, when one appreciates the responsibility invested in such an officer he can easily see that it is logical to assume that not just everyone should be charged with it. Undoubtedly, as experience brings maturity in this field, these officers will be very definitely trained for the position.

ADMINISTRATIVE DUTIES OF THE DIRECTOR

The work of the director varies with the size of the school system in which he is employed. The problems are, as stated above, fundamentally the same, but naturally the larger system calls for more time on the part of the individual in charge. The following discussion of the duties of the administrator and the type of organization necessary to ensure the proper functioning of the audio-visual instruction program will concern the situation as it is now most commonly found in the smaller city systems. However, the ideas or suggestions given here are more or less basic and so may be modified to meet the needs of the director of the audio-visual program in almost any system, large or small. Throughout this book many of the duties and responsibilities of the administrator have been mentioned or discussed rather briefly. However, these will be repeated here in order to give a more definite and complete picture of the work of the director of the audio-visual instruction program.

Appointing Assistants.—It is just as unreasonable to expect the director of the audio-visual program to get along without assistants as it is to expect the superintendent to do all his own clerical work. The director must devote a large part of his time to the development of the educational phase of the program, and he cannot do this if he is required to do all of the detailed work of the department. Several, depending on the size of the system, part-time or full-time assistants are necessary. A consideration of some of the numerous tasks involved in carrying on an audio-visual program will prove this point.

Clerical Assistant.—The nature of the audio-visual instruction program is such that a considerable amount of clerical work is necessary in order to make it function smoothly. The responsibility for having the desired materials ready at the time that they are needed is one of the important duties of the department. Files in which all materials are classified must be kept up to date. Records of all materials checked out for use must be made and filed. Time schedules for each film, set of slides, or other aid requested in advance must be compiled so these will not be expected by two instructors at the same period. Evaluation sheets must be kept on file and made available for any teacher who cares to use them. All materials rented from outside sources must be ordered and returned promptly. These are a few of the major duties of the clerical department.

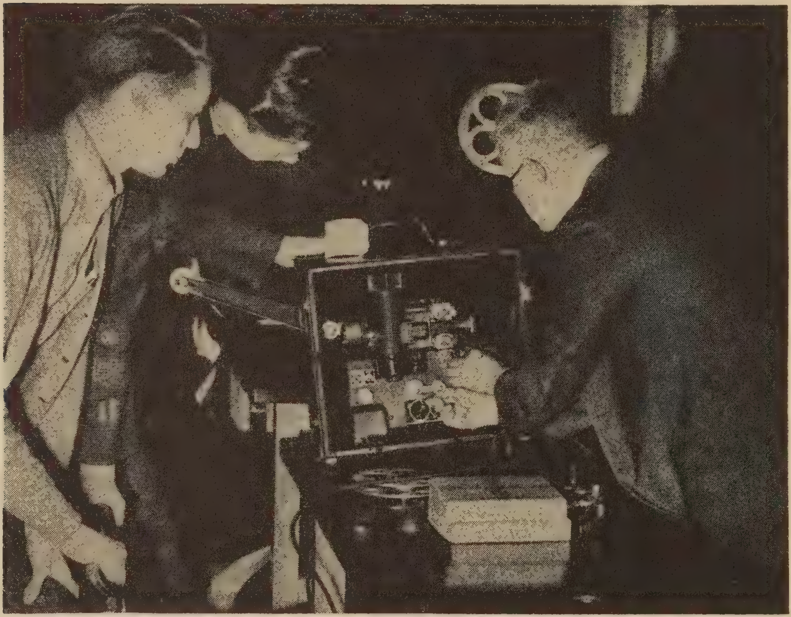

FIG. 91.—Students at Senn High School, Chicago, receiving instruction on the operation of a projector.

Mechanical Assistant.—The person selected for this position should have a thorough knowledge of projectors, radios, and other equipment. He should be able to make minor repairs on all equipment entrusted to his care. He should be able to splice, repair, and clean films. If operators are needed he should supervise their training. Except in the larger cities the care and operation of all sound equipment should be assigned to this individual. He will need to know how to hook up microphones, radios, phonographs, and how to take care of the central-sound or intercommunicating-sound system. In fact, much of the success of the audio-visual instruction program depends upon the reliable servicing of the equipment used.

The Distributor.—Whether films or other aids are rented or owned, they must be delivered to the instructor for use at the time requested. Where there are several schools in one system a light truck or delivery wagon will be needed to distribute projectors, films, museum collections, displays, etc. It is not only necessary that these materials be delivered on time but picked up and returned on schedule as well. It is now the common practice in the larger cities to allow the film to remain in the school for only one full day unless a special fee is paid. The distributor, unless all his time is required on the truck, generally has charge of the storeroom. He sees that all material, after it has been checked, is returned to its proper place. He also makes up his own distribution order from the requisition sheets prepared by the clerical assistant.

Preparing the Budget.—The preparation of the budget is one of the major duties of the director. In some of the larger cities the budget calls for as much as $40,000 a year. Regardless of the amount handled, it should be spent wisely. Whether figured on the per-pupil, per-school, or per-department basis, each instructor is entitled to due consideration. The director should be able to determine whether it is more economical to buy or rent certain materials. Wise and efficient administration of the budget will result in improved educational gains in every department.

Buying Aids and Equipment.—The purchasing of equipment and material is also one of the more important tasks of the audio-visual director. Through carefully prepared records he should be able to determine which machines have given the best service, with the minimum expenditure for maintenance. In smaller schools he should know where to contact sources of such information. He will need to spend considerable time in studying new material as it comes on the market so that the department can be kept up to date. Although he will purchase slides, films, pictures, and other materials he should not assume complete responsibility for the selection of these materials. The instructors who will use them should have the major say in their selection. The director's work in this area will be of an advisory nature. However, the director will in most cases select projectors, screens, curtains and similar equipment, as well as contract for, or otherwise provide, such necessities as projection booths, electrical connections, mountings, and the like.

Selecting and Equipping Space for Housing the Audio-visual Instruction Department.—In most schools there are generally very few rooms that are available for use by this new department and consequently it is sometimes necessary for it to use basement, third-floor,

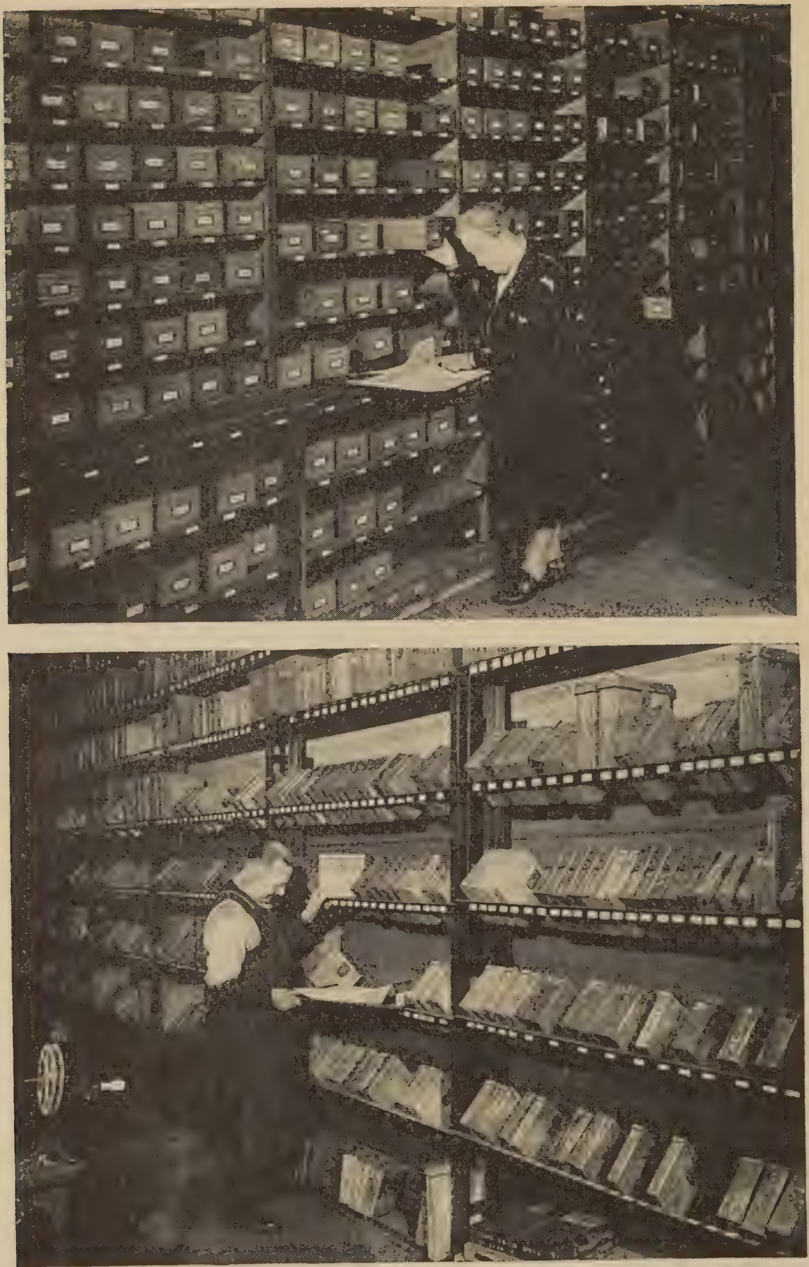

FIG. 92.—The lantern-slide and film libraries of a visually minded school system. (*Courtesy of Pittsburgh Public Schools, and Educational Screen.*)

attic, and other rooms that are not very suitable for classroom work. Needless to state, fire hazard, accessibility, and capacity must be considered. In very few instances will one find an ideal situation, but sometimes with a little planning, and even remodeling, old rooms may be made to answer the purpose very well. Office space and storage space are absolutely necessary. These two rooms should be separated if at all possible. Considerable space for the workshop should be provided in the storage room. Here all the equipment and materials can be checked over or repaired before being sent out again.

It is highly desirable that a small room with a seating capacity of at least twenty-five be provided as headquarters for the various audio-visual education committees. If possible this room should be equipped with a permanently installed projector so that instructors or others may use it for previewing films at almost any time. The purchasing committees and the director will find many occasions to use such a room.

In addition to preparing housing facilities for the department, the director should familiarize himself with desirable architectural features to be included in the construction of new buildings or the remodeling of old ones. The inclusion of many of these features will hasten the development of a well-balanced and profitable program. In short, the director should be considered the architectural expert in matters pertaining to the audio-visual program.[1]

Devising the Necessary Forms for Use in the Distribution of Materials.—The audio-visual department must be highly centralized if it is to function properly. It is true that some flexibility in the use of these materials in the classroom is lost through centralization, but it is only through centralization that these materials can be made available to all of the instructors. Of course, the less red tape there is to go through in getting these materials, the more frequently they will be used. The use of rented materials will require more elaborate forms or blanks than the use of school-owned materials. Before selecting definite forms or office records the director will find it advantageous to spend a few days visiting some of the larger systems that have good audio-visual departments.

In the smaller school, where practically all materials are to be rented, the director will find the following forms very helpful: Instructor's Requisition, Order Blank, Master Chart, and Weekly Schedule.

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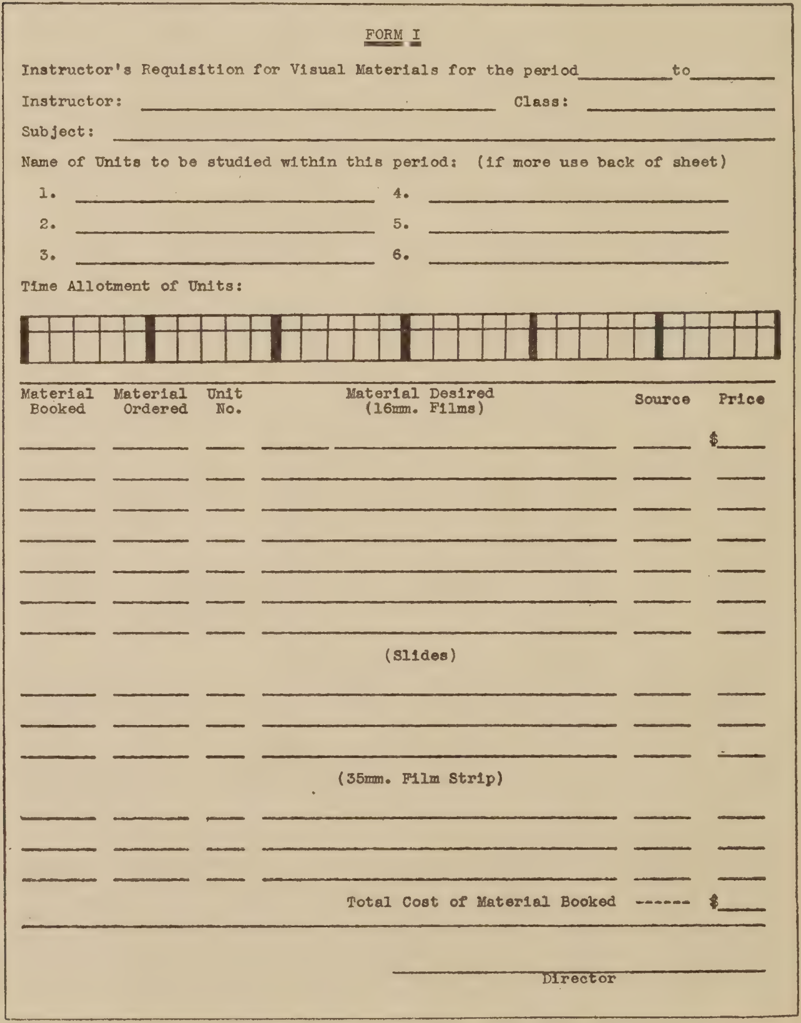
[1] For desirable architectural considerations see C. F. Hoban, C. F. Hoban, Jr., and S. B. Zisman, "Visualizing the Curriculum," pp. 281–297, The Cordon Company, New York, 1937.

A brief description of how they are used will show their place and importance.

Suppose the director, in order to secure film strips, lantern slides, and 16-mm. motion-picture films, both silent and sound, plans to use three sources, say, the visual libraries of the universities of Illinois, Wisconsin, and Missouri.

Form I: Instructor's Requisition (which may be easily prepared on any type of duplicating machine) is distributed and explained at a



FORM I

Instructor's Requisition for Visual Materials for the period__________to__________

Instructor: ______________________________ Class: ______________

Subject: ____

Name of Units to be studied within this period: (if more use back of sheet)

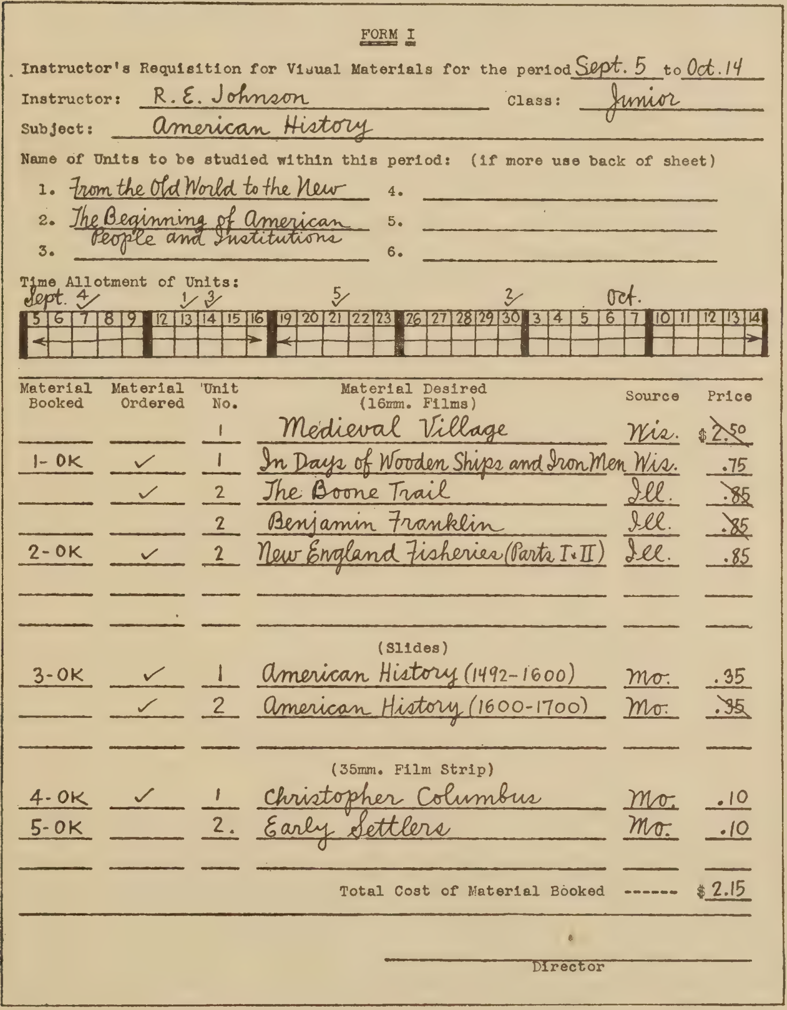
1. ______________________ 4. ______________________
2. ______________________ 5. ______________________
3. ______________________ 6. ______________________

Time Allotment of Units:

Material Booked	Material Ordered	Unit No.	Material Desired (16mm. Films)	Source	Price
					$
			(Slides)		
			(35mm. Film Strip)		
			Total Cost of Material Booked	------	$

Director

faculty meeting. To fill out this form the instructor will need the catalogues of each source listed. He should realize the importance of indicating as accurately as possible the time he will need, and the length of time he expects to use, each unit. He should also place the unit number before each aid. When all forms have been collected (one for each subject) the director will find that some teachers have a long list of desired materials, while others have few, if any. It is then his job to determine just how many aids each teacher may have for this



FORM I

Instructor's Requisition for Visual Materials for the period Sept. 5 to Oct. 14

Instructor: R. E. Johnson Class: Junior

Subject: American History

Name of Units to be studied within this period: (if more use back of sheet)

1. From the Old World to the New
2. The Beginning of American People and Institutions
3.
4.
5.
6.

Time Allotment of Units:

Sept. 4✓ 1✓ 3✓ 5✓ 2✓ Oct.

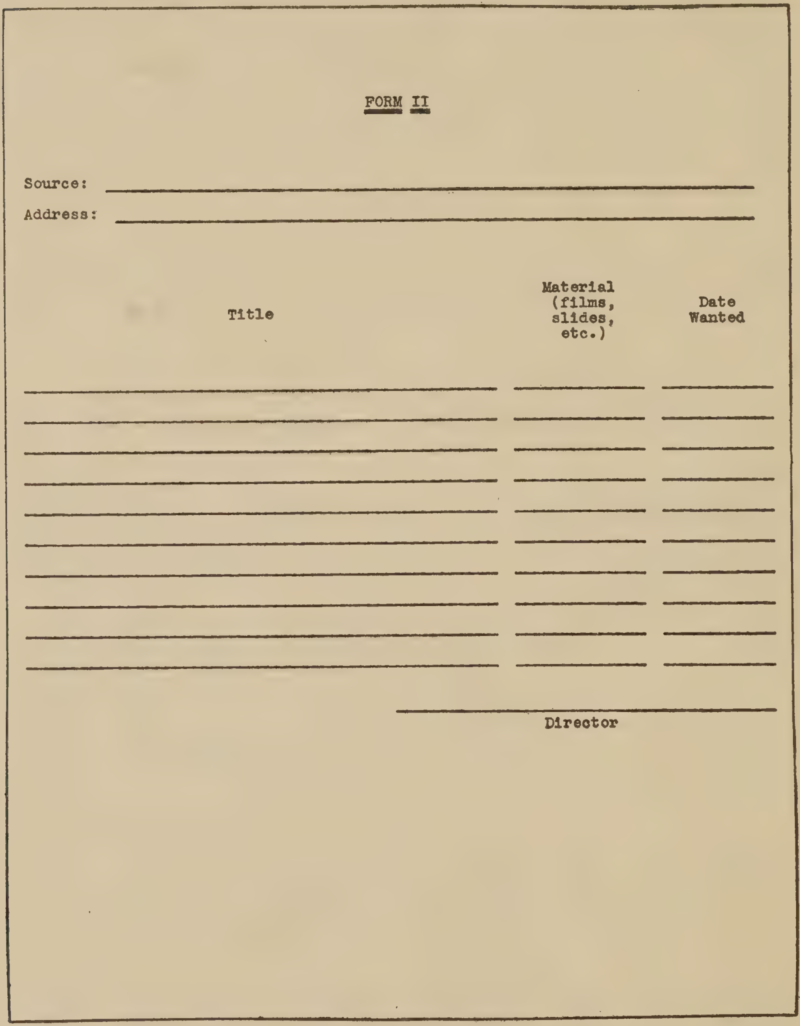
5	6	7	8	9	12	13	14	15	16	19	20	21	22	23	26	27	28	29	30	3	4	5	6	7	10	11	12	13	14
←									→	←																			→

Material Booked	Material Ordered	Unit No.	Material Desired (16mm. Films)	Source	Price
		1	Medieval Village	Wis.	$~~2.50~~
1- OK	✓	1	In Days of Wooden Ships and Iron Men	Wis.	.75
	✓	2	The Boone Trail	Ill.	~~.85~~
		2	Benjamin Franklin	Ill.	~~.85~~
2- OK	✓	2	New England Fisheries (Parts I & II)	Ill.	.85
			(Slides)		
3- OK	✓	1	American History (1492-1600)	Mo.	.35
	✓	2	American History (1600-1700)	Mo.	~~.35~~
			(35mm. Film Strip)		
4- OK	✓	1	Christopher Columbus	Mo.	.10
5- OK		2.	Early Settlers	Mo.	.10

Total Cost of Material Booked ------ $2.15

Director

specific period, and at the same time keep within the budget. Probably it is a good idea to ask the instructors to check those items they



FORM II

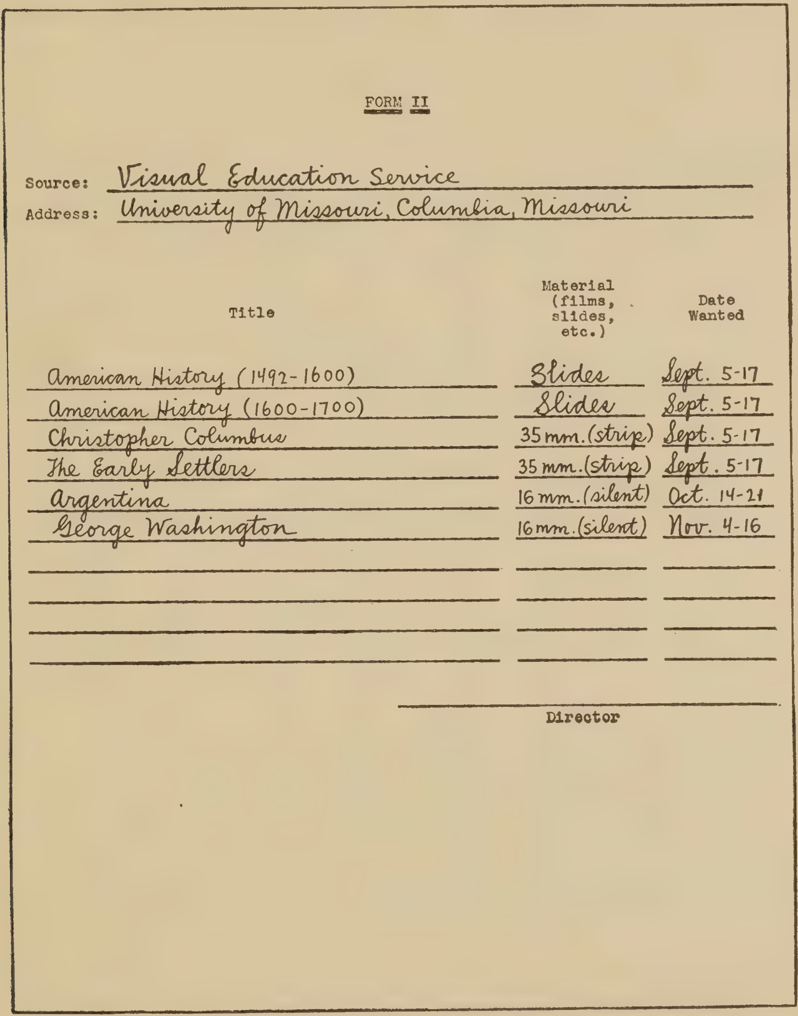
Source: ______________________________

Address: ______________________________

Title	Material (films, slides, etc.)	Date Wanted

____
Director

consider absolutely necessary. Naturally these blanks cannot be filled out in faculty meetings. Setting the date of collection for a week or two later will give the instructors time to study their needs, consult the catalogues, and fill in the forms. In order to be reasonably certain of obtaining the aids desired, it is a good plan to call for these requisitions several months in advance of the time at which the devices will be needed. Many schools now make up their lists a year in advance.



FORM II

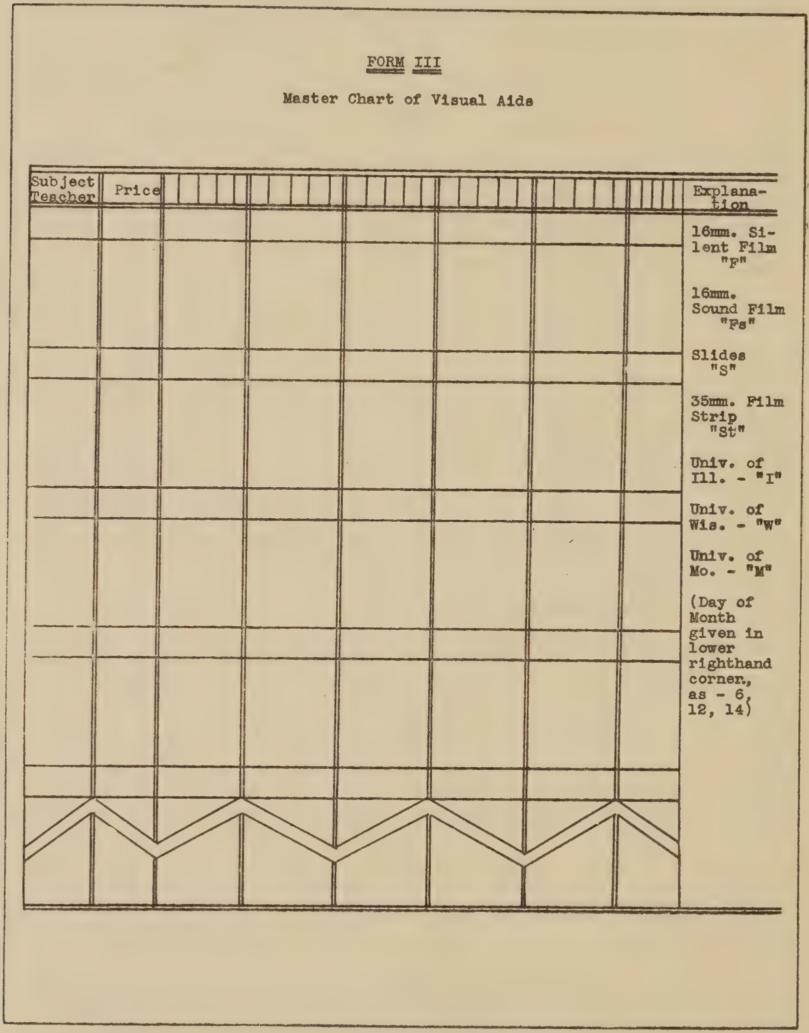
Source: Visual Education Service
Address: University of Missouri, Columbia, Missouri

Title	Material (films, slides, etc.)	Date Wanted
American History (1492-1600)	Slides	Sept. 5-17
American History (1600-1700)	Slides	Sept. 5-17
Christopher Columbus	35 mm. (strip)	Sept. 5-17
The Early Settlers	35 mm. (strip)	Sept. 5-17
Argentina	16 mm. (silent)	Oct. 14-21
George Washington	16 mm. (silent)	Nov. 4-16

Director

This is especially important if the aids are being borrowed from a source, such as a university, that has a limited number of prints.

Form II: The Order Blank is used in ordering materials from the sources. In the space under "Material" extreme care should be used to indicate exactly what is wanted; if 16-mm. films, whether silent or sound; if film strip, whether single frame or double frame, glass slide, etc. The director should check carefully to see that the dates listed



FORM III

Master Chart of Visual Aids

Subject Teacher

Price

Explanation

16mm. Silent Film "F"

16mm. Sound Film "Fs"

Slides "S"

35mm. Film Strip "St"

Univ. of Ill. - "I"

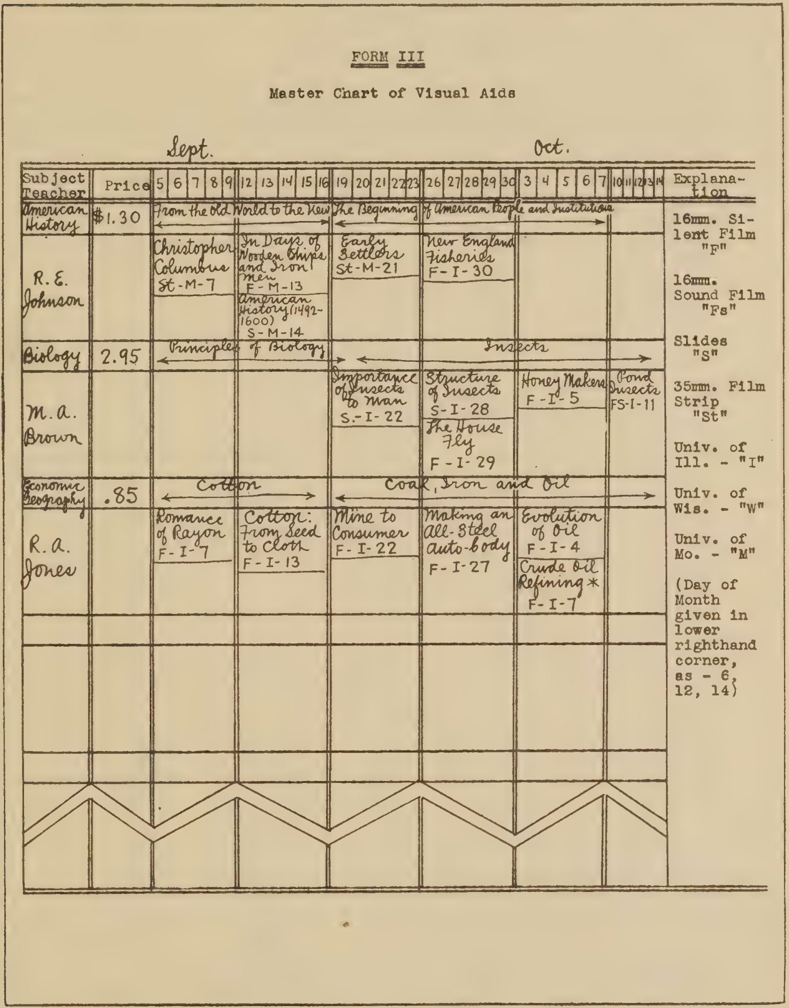
Univ. of Wis. - "W"

Univ. of Mo. - "M"

(Day of Month given in lower righthand corner., as - 6, 12, 14)

correspond to the time limits of the unit as indicated on Form I. As the titles are filled in on Form II a check should be placed before the corresponding title under the word "Ordered" on Form I.

After the order has been sent in and filled, the director will receive a list from the library giving the date on which he may expect to use each aid. This source list is now checked against each instructor's requisition, Form I, and if the film or aid desired comes within the specified



FORM III

Master Chart of Visual Aids

Subject Teacher	Price	Sept. 5 6 7 8 9	12 13 14 15 16	19 20 21 22 23	26 27 28 29 30	Oct. 3 4 5 6 7	10 11 12 13 14	Explanation
American History	$1.30	From the Old World to the New		The Beginning of American People and Institutions				16mm. Silent Film "F" 16mm. Sound Film "Fs" Slides "S" 35mm. Film Strip "St" Univ. of Ill. - "I" Univ. of Wis. - "W" Univ. of Mo. - "M" (Day of Month given in lower righthand corner, as - 6, 12, 14)
R. E. Johnson		Christopher Columbus St-M-7	In Days of Wooden Ships and Iron Men F-M-13 American History (1492-1600) S-M-14	Early Settlers St-M-21	New England Fisheries F-I-30			
Biology	2.95	Principles of Biology		Insects				
M. A. Brown				Importance of Insects to Man S.-I-22	Structure of Insects S-I-28 The House Fly F-I-29	Honey Makers F-I-5	Pond Insects FS-I-11	
Economic Geography	.85	Cotton		Coal, Iron and Oil				
R. A. Jones		Romance of Rayon F-I-7	Cotton: From Seed to Cloth F-I-13	Mine to Consumer F-I-22	Making an All-Steel auto-body F-I-27	Evolution of Oil F-I-4 Crude Oil Refining * F-I-7		

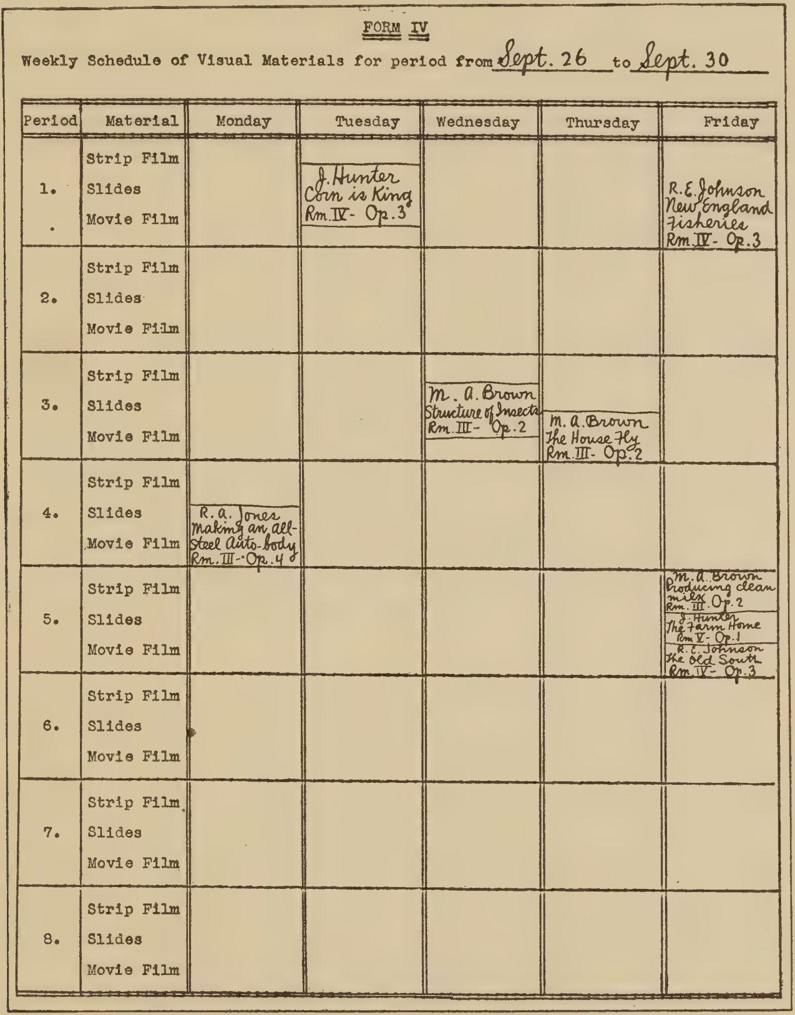
time limit, it is marked "OK" in the space under the heading "Material Booked." At the same time a check should be placed in the "Time Allotment of Units," indicating the exact day for which the aid has been scheduled. On this check should be written the catalogue number. If no catalogue number is given, then a letter or number may be used to indicate the aid assigned for that day. Under the column marked "Price" cross out the price of all aids in the "Desired List" not booked and give the total in the space provided. Thus, when Form I is turned back to the teacher, he knows exactly how many aids he is to use during the period and the date on which he may expect each one. One will probably realize by this time that all of this work must be done in advance, and the director will find that he may some-

FORM IV

Weekly Schedule of Visual Materials for period from__________to__________

Period	Material	Monday	Tuesday	Wednesday	Thursday	Friday
1.	Strip Film Slides Movie Film					
2.	Strip Film Slides Movie Film					
3.	Strip Film Slides Movie Film					
4.	Strip Film Slides Movie Film					
5.	Strip Film Slides Movie Film					
6.	Strip Film Slides Movie Film					
7.	Strip Film Slides Movie Film					
8.	Strip Film Slides Movie Film					

times have to send orders to two or three sources before securing the materials needed by the various instructors.



FORM IV

Weekly Schedule of Visual Materials for period from Sept. 26 to Sept. 30

Period	Material	Monday	Tuesday	Wednesday	Thursday	Friday
1.	Strip Film Slides Movie Film		J. Hunter Corn is King Rm. IV- Op. 3			R. E. Johnson New England Fisheries Rm. IV- Op. 3
2.	Strip Film Slides Movie Film					
3.	Strip Film Slides Movie Film			M. A. Brown Structure of Insects Rm. III- Op. 2	M. A. Brown The House Fly Rm. III- Op. 2	
4.	Strip Film Slides Movie Film	R. A. Jones Making an all-steel auto-body Rm. III- Op. 4				
5.	Strip Film Slides Movie Film					M. A. Brown Producing clean milk Rm. III. Op. 2 J. Hunter The Farm Home Rm V- Op. 1 R. E. Johnson The Old South Rm. IV- Op. 3
6.	Strip Film Slides Movie Film					
7.	Strip Film Slides Movie Film					
8.	Strip Film Slides Movie Film					

After all material has been booked and OK'ed on Form I, the director will prepare a master chart (Form III) on heavy cardboard for his own use.

Form III: Why keep a master chart? Because it is a great help and a timesaver to the director in administering the program. From it he is able to see at a glance exactly how many items to expect during each day of the week. If different colored ink or pencil is used for each type of aid, he can tell very easily the number of different types of material to expect. He can readily see which instructors are making the greatest use of these aids. He can also tell at a glance the amount of money used by each instructor, by each department or subject, and also the total amount of the complete visual-aid program. He can also see which units of subject matter are overcrowded with visual materials, and those with which no aids are being used. These conditions may be due to careless selection on the part of the instructor or to the fact that suitable aids for that particular unit are not available from the sources selected. If the former, he can probably help the instructor make better selections; if the latter, he may find it necessary to use other sources to supply material for these units. In short, he will find that the master chart enables him to see the visual-aid program in its entirety—the number of aids used, unit distribution, subject distribution, and cost per subject or department—a step which is absolutely necessary in the development of a well-rounded visual-aid program, and one that can be attained in no other way. Such a device may also inspire those teachers whose few requisitions contrast strikingly with the many requisitions of other instructors to use more of these materials. If for no other reason the master chart will be worth all of the time required to prepare it because of the ease with which the director can make up the "Weekly Schedule" (Form IV) from it.

Form IV: Filling out Form IV from the master chart requires but a minimum amount of time. Space is provided in each period of the day for the different types of materials. The instructor's name, the title, the room, and the operator's number should be written in according to the period at which the class meets. The value of Form IV will be more apparent when one stops to consider that if six teachers in the school were using visual aids in at least three subjects, there would be the possibility of eighteen aids being used on any one day, and unless these were efficiently assigned and distributed, untold confusion would result. If all materials are presented in a special room equipped for this purpose, the room number, of course, is not needed. It is desirable to have more than one room available, because there will be less conflict in arranging the room schedule, especially when the school is using several types of material. This form, when filled in and posted on the bulletin board, gives the necessary information for both the instructors and the operators. It may also be used in checking in materials after they have been used. Titles may be crossed out by the person in charge of wrapping and returning these materials to their sources.

To the inexperienced it may seem that some of the above forms are unnecessary, or that they may require too much time on the part of the director. However, it is well to keep in mind the fact that, if the visual-instruction program is to be a success, much of that success depends not only upon securing material but upon having it on hand when needed. Carelessness in booking films or in scheduling the use of rooms and projectors will result, at best, in only a mediocre program.

Naturally, any person planning to use the above forms should adapt them to meet the needs of his own school. A little practice in using them will show that they are quite workable and very much worth-while.

If student operators are used, simple forms for notifying them may be prepared. These forms should include the hour the materials are to be shown, the room number, and the types of materials that are to be used.

An evaluation form will be found valuable in any size or type of school setting. This is especially true when a department is just being started, or when a film is being used for the first time. The purpose of the evaluation form is to provide a record so that other teachers interested in using the same film may know the reactions of those who have already used it. The following suggests one type of this evaluative form.

Film ____________________ Instructor ________________ Date __________
Company producing ____
Source ______________________________ Silent __________ Sound __________
(If rented)
Used in grade ________________________ Subject ____________________
With unit on ____
For use with this unit the film is:
Excellent ________ Good ________ Average ________ Fair ________ Poor ________
Student interest and reaction to the film:
Excellent ________ Good ________ Average ________ Fair ________ Poor ________
Comments ____

I recommend this film for use in grade ____________ Subject ______________

The information recorded on this evaluation chart will be of great help to other instructors only if it is made available for their use. After films have been used over a period of years the evaluations will not be so valuable because most of the teachers will be more or less familiar with those suitable for use in their departments. At the same time these records will be of great help to instructors who are new to the system. Obviously, too, they will prevent poor films from being used again.

Collecting and Classifying All Materials.—In almost any situation the director will find a great deal of material scattered about the various buildings and in the various departments. Through the cooperation of the teachers, these materials should be stored with the department of audio-visual instruction. Suggestions on classifying, mounting, indexing, and storing of pictures, slides, film strips, motion-picture films, and phonograph records have been discussed in detail in the chapters covering each of these aids; hence they will not be discussed here. The main object in centralizing these materials is to make them available to all instructors. The more definite and detailed the classification is, the more frequently will the aids be used.

Providing Information on Rental Materials.—Generally the libraries lending films will supply all the catalogues necessary for use in the school system. A list of the catalogues of the sources from which the school expects to secure materials should be placed in the hands of all instructors. The descriptions of the materials listed in each catalogue will help the teachers to locate easily the aids they wish to use.

Preparing Handbooks and Other Descriptive Materials.—The handbook, which will be discussed more in detail under "Teacher Training," represents another practical and functional means of training in-service teachers. Certainly every instructor in the school system should be familiar with the purposes and objectives of the audio-visual department. He should also be familiar with the procedures necessary to secure the desired materials and the techniques of using them. All these may be set forth in the handbook or other descriptive materials. As new aids are added, supplements describing and listing these materials should be prepared and given to the instructors. Obviously, the more familiar the instructor is with the available materials, the more he will use these aids.

Educating the Community in Audio-visual Instructional Ideals and Procedures.—The school is supported by the public. It, as well as the board of education, should know how educational funds are being spent. Well-planned demonstrations given before the PTA, luncheon clubs, civic bodies, and community gatherings of various kinds will help in building public support for such a program. There are probably very few parents who could not see the advantages of using audio-visual aids; but they cannot see these unless they are shown. And they can be shown most convincingly by authoritative and competent discussions, exhibitions, and demonstrations.

SUPERVISORY DUTIES OF THE DIRECTOR

The director of audio-visual instruction, like any other department head, is not merely an administrator who organizes and develops the program, obtains, distributes, and cares for materials, and promotes community appreciation, but he is also a supervisor who provides for the training of teachers and supervisors, oversees and coordinates instructional phases of the program, and evaluates results. A few of the more important of these supervisory duties will be discussed in this section.

Selecting and Appointing Committees.—As has been stated before, the development of an audio-visual program is a cooperative enterprise. The director must have the cooperation of the faculty, and the faculty must have the cooperation of the director if the program is to meet with a maximum of success. One of the best ways in which to bring about this mutual cooperation is the selection and appointment of an Audio-Visual Aids Committee. This group of competent and respected instructors and supervisors should represent a cross section of all the offerings of the school, both elementary and secondary. Its size will depend upon the extent and variety of the program, the size of the faculty and student body, the teachers' and supervisors' time available, and other elements. It should include both men and women.

In general, the duties of this body are largely advisory. However, it may in many instances help the director to develop policies, plan budgets, promote teacher training, collect, examine, prepare, evaluate, and distribute aids, develop the handbook, assist with demonstration lessons, survey instructional possibilities, assist new or inexperienced teachers, recommend measures, and perform other very definite duties. Because its members come from the faculty, the committee becomes a representing body, and at the same time, because of its relationship to the director, it becomes also a promotional group. It does not supersede or replace the director, nor does it remove the necessity for centralization of authority in one individual. Rather, it assists in all ways possible. In larger cities it is probably advisable to organize several committees, each with a particular function or responsibility.

But even in such instances there should be a central main committee to coordinate the efforts of these subcommittees.[1]

Conducting Faculty Meetings.—As will be discussed more in detail later, the general faculty meeting represents a most important opportunity for training teachers in the philosophy, psychology, and practical procedures of the audio-visual aids. And properly capitalizing this opportunity is one of the director's most important responsibilities. He may do this at regular or specially called meetings, or both. At these meetings he will explain the educational objectives that have been set up, the general policies of the department, and the procedures to be followed in requisitioning, utilizing, and evaluating the various types of aid, and in other ways promote the aids-education of the teachers. And, just about as important, the director will not only teach the instructors, but will insure that they teach him. In a free-and-easy, give-and-take atmosphere he can undoubtedly learn from the reactions, questions, comments, and general attitude of the faculty members a great deal that will be beneficial to him in his work. The general faculty meeting then, as well as similar departmental or smaller meetings, represents group assistance or group instruction in the use of aids.

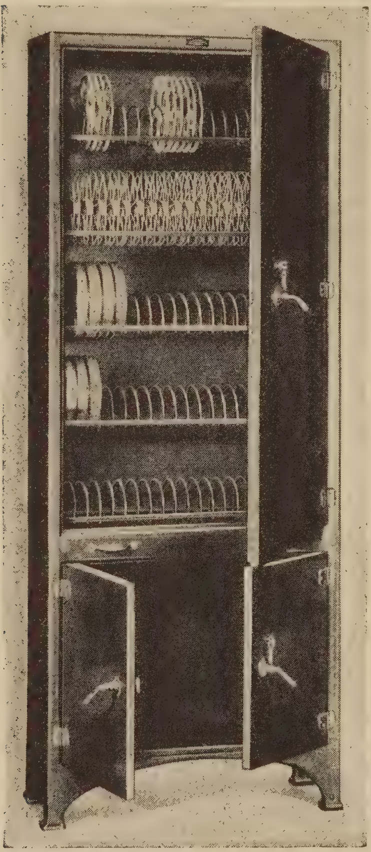


FIG. 93.—Storage space or equipment for films and projectors represents a good investment. (*Courtesy of Neumade Products Corporation.*)

Assisting Teachers.—A second type of assistance which the director is in position to give to the members of the faculty is individual instruction. This differs from group assistance only in that it is adapted to more specific needs in more limited areas. Although part of this may reflect somewhat theoretical philosophy and psychology, nearly all of it will represent practical procedures. What should be done? When? Where? How? Why? These are the types of questions that must be answered very specifically with particular settings, material, and pupils in mind.

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[1] For the detailed activities of various types of committees see M. R. Brunstetter, "How to Use the Educational Sound Film," pp. 80–87, University of Chicago Press, Chicago, 1937.

Obviously, it would be unwise to assume that all teachers (or supervisors, for that matter) have the same interest or competency in, or the same experience with, all types of aid; and, for that matter, the same need for all of them. The teacher, depending on her training, experience, and setting, may need help on a number of types of aid, or she may need help with only a limited number, or in highly particularized situations. Naturally, then, one of the first jobs of the director is to survey his group and locate interests, experiences, and needs; in short, to locate strengths that require only maintaining and further capitalization, and weaknesses that require strengthening. Here again a give-and-take, free-and-easy atmosphere is far preferable to a rigid, dictatorial "now-here's-the-way-you-should-do-it" type. A complimentary pat on the back for good work, and a bit of well-placed and inoffensively given criticism for poor work represent two helpful procedures in any type of superior-inferior relationships. The practical procedures to be used in connection with the various types of aid have already been suggested in connection with these, and need not be repeated here.[1] A further discussion from a slightly different angle will be found in the section on teacher training.

Incidentally, in this relationship also, the director should be a learner as well as a teacher. He can learn subject matter, what aids are apparently the most suitable and profitable with particular kinds of material and pupils, and he may even learn techniques from the more successful teachers and supervisors. His learning should, naturally, then be capitalized in different settings with other teachers and other types of materials.

It is pertinent to emphasize in this connection that the director does not replace the teacher. A few years ago it was quite customary for this individual, especially in connection with the use of motion pictures, to secure and present the film and also, in the case of silent films, to give the lecture. Sometimes he would gather up his belongings and leave after running the film, and sometimes he would remain and teach the remainder of the lesson. Even recently in some schools visited by the authors this same procedure was still being followed. Fortunately such a practice is not very common, and it will be still less so when both the teacher and the director realize their proper responsibilities. An occasional demonstration by the director is quite desirable, provided he is competent in subject matter, but a substitution for the teacher is quite another matter.[1]

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[1] See also Chap. III.

Assisting Supervisors.—If there are supervisors in the school system, the director will work to a considerable extent through them because they know more than he about their subjects and are in closer contact with the teachers under them. The director may assist the supervisors through all or nearly all of the ways suggested in connection with the task of assisting the teachers; such as: (1) planning with supervisors and their teachers; (2) visiting classes with the supervisors; (3) organizing simple experiments; (4) holding individual conferences and group meetings; (5) providing demonstration lessons; (6) preparing bulletins and other similar instructional material; (7) developing and adapting aids; (8) promoting open-house exhibits and other events; and (9) arranging for teachers and supervisors to visit other classes and other schools, attend and participate in educational meetings and conferences, etc.[2] Naturally the relations between the director and the supervisors should be mutually cordial personally and respectful professionally.

Arranging Demonstration Lessons.—Because it is concrete, practical, and pertinent, a demonstration lesson represents one of the best media for acquainting teachers with the possibilities and the correct utilization of audio-visual aids. This is especially true if the lesson has been planned with "a head and a tail," unhurried prelesson and postlesson discussions of it. There is always a possibility that such a lesson may be a sort of staged performance, a rehearsed production, but even this does not necessarily handicap effective illustration; in fact, it may enhance it.

There are two ways in which demonstration lessons can be provided, to arrange them as more or less natural dramatic productions for a group of teachers, and to send teachers, in groups of not more that two, to visit classes where audio-visual materials are being used. Perhaps this second type is more natural and less formal because the lesson is conducted in the regular room and in the regular manner. On the other hand, the formal demonstration lesson may be better done, and too, provision is more usually made for immediate pre- and post-lesson discussions with the teacher. However, there is a place in the director's schedule of instruction for both types of lessons.

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[1] A somewhat discouraging picture—if one considers only the facts presented, or encouraging—if one considers the educational opportunities implied, is C. F. Hoban's, Some Teaching Tragedies, *Educational Screen*, vol. 17, pp. 132–133, 137, Apr., 1938.

[2] Administrators interested in initiating a program will find valuable help in M. R. Brunstetter, "How to Use the Educational Sound Film," pp. 96–113, University of Chicago Press, Chicago, 1937.

Obviously, the director should be able to teach a good demonstration lesson not only in his own field, but in related subjects as well. However, it will be impossible for him to teach these lessons in all grades and all subjects, and he will have to schedule the more competent teachers or supervisors, either from the same school or from other schools, for many of them. At the same time, it is reasonable to expect the director to be able actually to demonstrate what he is attempting to do in his field. Also, such demonstrations will help him to win the professional respect of his teachers, without which there is no effective supervision.

Coordinating and Supervising the Use of All Sound Equipment.—At the present time the radio, as a tool in classroom instruction, is just in its infancy. However, with the introduction of the central-sound system, and with the cooperation of leading educational institutions, it will soon be recognized as one of the outstanding aids in the educational field. The director should have charge of this centralized-sound system, or, at least, he should so arrange the program that the class or classes requesting a special radio program will have it at the desired time. If records are to be used on the system the program will have to be arranged just as carefully.

In some of the large city systems several sets of the same slides have been prepared so that they may be presented in as many as twenty classrooms at the same period. The teacher simply shows the slides that accompany the lecture given over the radio. She changes the slides at a not-too-obvious signal from the speaker. Excellent results have been reported where this method has been used. The chief advantage, of course, is the fact that one well-prepared lecture, given by a leading authority, may be heard in several classrooms at the same period. Because of the expense involved, this procedure will probably be limited to the large city systems.

Supervising the Preparation of School-Produced Materials.—The director can give valuable assistance in the preparation of pictures, models, maps, charts, slides, and other materials.

If the instructor wishes to prepare handmade slides the director can explain the various types that may be made and the methods employed, and provide the necessary supplies and materials. If the slides are to become a part of the permanent library, he should see that each one is properly mounted, labeled, and classified.

If photographic slides or films are to be prepared, he should be able to assist in their production. Many schools are now making the school trip a definite part of their classroom teaching technique. On nearly every tour of this kind there are numerous scenes and items that, photographed, will serve as an excellent summary of the event. In addition, often other classes will also find these pictures or slides useful in the development of certain units.

Similarly, many teachers visit interesting places during their vacations. With their cooperation the director will be able to build up a library of slides or strip film, or for that matter, post-card views, illustrated booklets, objects, specimens, and other items, that will meet the needs of many of the teachers in several different types of instructional settings.

Training Teachers.—Without doubt one of the major responsibilities of the director of the audio-visual program is to provide or promote suitable training for the instructors. And because (1) the field is relatively new, and (2) all, or nearly all, teachers have opportunities for the use of these materials, this responsibility involves many difficulties of organization, administration, supervision, and promotion.[1]

Briefly, the objectives of such training are to (1) help the teacher to recognize and appreciate the place and possibilities of visual aids in general; (2) acquaint her with a wide variety of available materials and their sources; (3) show her the advantages and limitations and the instructional possibilities of the various types of aid and equipment; (4) teach her to operate projectors and other devices; (5) instruct her in the proper techniques and procedures of developing audio-visual lessons; (6) provide training in the correlation of the various aids with each other and with subject matter; and (7) acquaint her with rating and evaluative plans, materials, and devices. Accomplishing all these objectives is, of course, a sizable job, but it is one that must be done more or less completely if the program is to be effective.

Although there is no disagreement on the extent of the existing need for teacher training in the use of audio-visual materials, there is a difference of opinion concerning the way in which this training should be provided. In one group are those who believe that this instruction should come as a part of regular methods courses. Opposed to this view are those educators who feel that this training should be provided in a special course.[1] The chief objection to the opinion of the former group is that very few methods teachers are themselves prepared to present this program adequately. The rapidity with which teachers colleges and departments of education are introducing courses in visual instruction would seem to indicate that the present trends are in harmony with the opinion of the second group.

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[1] The rather extensive literature on this topic is well presented in digest form by Dale, Dunn, Hoban, and Schneider in "Motion Pictures in Education," pp. 369–456, The H. W. Wilson Company, New York, 1938. A more recent article, one very comprehensive and detailed, is D. D. Jayne, Standards in Teacher Training in the Use of Visual Aids, *Educational Screen*, vol. 19, pp. 110–111, 114, March, 1940.

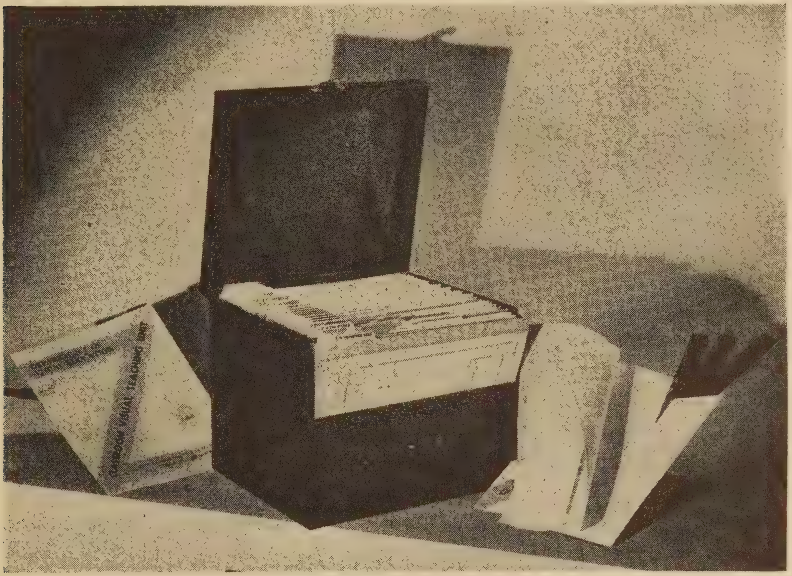

Fig. 94.—A compact and convenient visual instruction outfit. The various units, each complete with plans, references, questions, procedures, follow-up activities, and film strips, are stored in a metal case. The appropriate film strips are filed in the flap of each folder. (*Courtesy of Classroom Teacher, Inc.*)

Obviously, two groups of instructors must be planned for, (1) teachers in training, and (2) teachers in service. These groups represent somewhat different instructional settings. Although the official's direct responsibility is largely with the teachers in service, yet at the same time indirectly it will also concern teachers in training. Further, although he will not be in charge of university summer or extension courses, yet here, too, he will have an indirect responsibility; he can promote these courses, encourage teachers to take them, and on the basis of his own experience, help to determine their general and specific content.

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[1] See Dale, Dunn, Hoban, and Schneider, *op. cit.*, pp. 435–440.

Teachers in Training.—It is relatively easy to meet the needs of these individuals because they are still members of various educational institutions interested in the preparation of teachers. The fact that courses in audio-visual instruction are being introduced very rapidly by colleges and universities seems to indicate that these teachers in training have ample opportunity to prepare themselves for work in this field. However, the great majority of such courses are offered only during the summer months and consequently many of these teachers-to-be complete their work with little special preparation. In order to train these individuals, courses should be offered during the regular term. As the demand for teachers with training in audio-visual instruction becomes greater, these courses will, no doubt, be made a part of the regular teacher training curriculum, as they are now in Pennsylvania.

Teachers in Service.—The problem of providing adequate training for employed teachers is one of the troublesome problems in the development of the audio-visual instruction program. Many of these teachers have completed their formal education, and so are not easy to reach through regular courses in teacher training institutions. The following methods of providing instruction for this group are now being used: (1) summer session courses, (2) extension courses, (3) short informal courses conducted by the director of the audio-visual program, (4) supervisory help, and (5) special handbooks. There are certain advantages and disadvantages to each of these methods.

Summer Session Courses.—As was pointed out above, many colleges and universities are now offering summer courses in this field. These courses, often taught by experienced audio-visual directors, are usually substantial and practical. However, only a small proportion of the teachers now employed attend summer school and consequently these opportunities are capitalized by relatively few instructors. It would take many years to provide the needed training by this one method alone.

Extension Courses.—From observation and experience in teaching summer courses in audio-visual instruction, the authors are convinced that this is by far one of the best methods of reaching the teachers now employed. The reasons are clear: extension courses are relatively inexpensive; they are convenient; they provide opportunities for the teacher to experiment with these materials in her own classroom; and most of the discussion in such classes centers around the particular problems of each teacher. For this reason extension courses should be more widely used to reach teachers now in service.

Short Informal Courses Conducted by the Director of the Audio-visual Instruction Program.—Courses of this type are now being offered in many of the larger cities. In a few states county directors are offering similar opportunities for teachers in service. In most instances, at least, credit towards a degree is not granted for this work. It is easy to appreciate how very practical such a course may be; it usually enrolls a small and compact group of teachers who are acquainted with each other, who represent few subject-matter fields, who are vitally interested, and who demand material that is immediately useful. Obviously, instruction in such an informal setting so close to each teacher's own job can be immensely profitable.

Special Handbooks and Bulletins.—Many schools have prepared and issued special handbooks, bulletins, syllabi, booklets, and other simple publications for the teachers' use. In general, these publications may be classified into two types (1) those concerning the mechanics of handling the aids, and (2) those designed to help the teacher actually use these materials. And, of course, there are combinations of these two types.

The first type of publication deals with such processes as how to operate, adjust, repair, and care for projectors, sound systems, phonographs, and the like; how to make lantern slides, models, and maps; how to design and construct exhibits; and how to trim, mount, label, and store photographs and prints. Much of this material comes from instruction booklets issued by manufacturing companies. Some of it comes from descriptive articles in magazines and books, and of course, some of it represents adaptations and more or less original contributions by the teachers themselves.

The second type of publication is more of a teacher's guidebook, planbook, or manual on how to utilize audio-visual aids. It varies in size and content all the way from a simple sheet of more or less general suggestions to rather complete detailed course syllabi or outlines which the teachers may follow. The most complete of these bulletins include detailed lesson plans with assignments, reviews, questions, pretests, final tests, etc., as well as the specific aids to be used, and where and how they are to be used. Naturally, if this material is prepared by local teachers and experimented with, in time after repeated uses it becomes more or less established. Probably, too, it represents mature experience and is, therefore, rather substantial. On the other hand, however, it can never be accepted as "final"; adaptations and changes will always be necessary, if for no other reasons than that (1) old materials become obsolete, and (2) new materials are constantly appearing. It is easy to see how these handbooks and bulletins can help the teacher to plan, select, and use materials effectively and economically.[1]

Evaluating the Program.—There can be no really good automobile, house, shotgun, book, audio-visual program, or anything else without an evaluation of how well it looks and operates. Great amounts of money are being continuously spent in educational systems and institutions in attempting to discover high and low places in policies, materials, and techniques; and these expenditures are justified if they result in improvement. Similarly with the audio-visual field; the expenditures of time and money must be evaluated as accurately as possible in order to improve the program and so justify these investments. And the director, the head of the department, must accept this as another of his important responsibilities.

There are a number of items that must be considered in this program of evaluation and these, for our purposes here, will be grouped into three classifications, (1) expense, (2) the extent to which available materials and equipment are used, and (3) the manner in which the materials are used, or the qualitative results. A short presentation of each of these will show its place in the evaluative program.

Expense.—It may seem to some individuals that the cost of a sound projector, a radio, or other piece of equipment of a similar nature is out of proportion to the value which will be received from the use of it. However, it is well to remember that it is possible to use such equipment in every grade from the primary on through the high school and in practically every subject field. It becomes one of the most used pieces of equipment in the entire school system. Because of this wide use, the per-pupil cost of a projector is very small, much smaller than the per-pupil cost of typewriters or other machines or devices that can be used only for limited periods and in connection with only certain classes or groups.

In order that the director may have a basis for comparing the costs of the audio-visual department with those of other departments in the school, he should reduce it to a per-pupil basis. For more effective administration, the director should also know the cost per school, where there are several schools in the system. These per-pupil costs are comparable, if they represent about the same educational settings, and a knowledge of them will enable the director to make a more equitable distribution of materials, or at least to know where more work is needed in order to secure this distribution. Likewise the director will find the per-department cost very valuable, especially when requesting new materials. The department cost may reveal areas in which no visual or audio-aids are used, and again it may point out areas in which they are being used excessively. These comparisons may indicate where more missionary work is necessary in order to secure the cooperation of the lagging departments. And, if the chief cause of unfavorable comparisons is lack of materials, he can plan to provide these.

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[1] For a suggestive outline of this type of material see G. Pickwell, Visual Aids in the Science Program in California, *Visual Review*, pp. 10–14, 1937. Pertinent references to teacher training are the articles by Dale, Dunn and Schneider, Reed, and Starnes, in the bibliography.

Extent to Which Available Materials Are Used.—Obviously, the per-pupil or per-department cost is not a safe sole criterion on which to judge an aids value. Some of the aids are relatively expensive, and others are relatively inexpensive. Consequently, a second phase of evaluation concerns the number and types of audio-visual devices used by the various teachers or departments. What was used by each teacher or department? How many times was it used? These are questions that give the director a quantitative evaluation of the program.

Here again, care must be used in order to avoid erroneously and unfairly labeling a teacher or department with a small record of total uses as "uncooperative" or "conservative." Such teachers or departments may require (1) some missionary work; or (2) more suitable materials. Perhaps their low records can very properly be blamed on the director himself.

Needless to state, from this quantitative record of use the director should survey or inventory his aids in order to discover those that have been overused and those that have been underused. In the case of the former, it may become obvious that additional units are needed; and in the case of underuse it may be desirable, if interested and cooperative teachers do not utilize the devices, to dispose of them. In short, a quantitative evaluation is a sort of measuring stick by which the director judges the relative popularity of the various devices or aids.

Manner in Which Materials Are Utilized.—The expense of the materials and the number of times they are used represent only indirect measures of the value of the aids program. The most important evaluation, naturally, concerns results accomplished. This qualitative analysis of almost any educational setting or material is difficult to make because (1) many of the real effects or results may not show up clearly for years, and (2) of the difficulty of differentiating and evaluating the forces or influences that created these results. However, even though they are not accurate measures, yet both subjective and objective evaluations of such items as student and group records, apparent interest, extent of participation, class atmosphere, and disciplinary problems will, undoubtedly, show something about the results obtained. More accurate measurement can be made on the basis of controlled experiments, but these are not always either possible or desirable. Comparisons of the records of individuals and groups with others is a looser form of this controlled experimentation, and is valuable. As was pointed out in Chap. III, the students themselves should help to make these evaluations.[1]

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[1] A list of suggestive questions concerning the results of using motion pictures will be found in E. Dale, and L. L. Ramseyer, Teaching With Motion Pictures, *American Council on Education Studies*, Series II, vol. I, April, 1937, pp. 46–50.

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CHAPTER XV

WHAT NEXT?

A glance through this, or any other book of a similar nature, would undoubtedly amaze the uninitiated individual—the one who may have heard about audio-visual instruction, but who had never had either firsthand or secondhand experience with it. Frankly, a knowledge and an appreciation of the wide variety and the unlimited possibilities of the materials now available have amazed even the authors through the many months in which this volume has been in preparation, and both of these individuals have had some little theoretical and practical experience in educational matters. A great deal of progress has been made during the past ten or fifteen years.

However, in concluding this discussion of what has been and is being done, it is also pertinent to indicate what yet remains to be accomplished. And this is not done in an unappreciative or supercritical manner to discredit past achievements. Nor is it to repeat uselessly what has already been set forth in connection with all of the aids discussed. And further, it is not designed to answer all of the many questions that are still unanswered; such an attempt would be amateurish, to say the least. Rather, this presentation is for the purpose of emphasizing and so focusing attention on a very few of the most important problems that lie ahead.

In one way, audio-visual instruction is at the crossroads; the interest of producers, educators, and citizens has been aroused, and the vital question confronting the workers in the field is whether or not this interest will continue to develop in the direction of an intelligent and discriminating support of the program, or whether it will gradually decrease as new educational movements and emphases appear.

As a setting for a description of a Middle Western teachers' forum designed to facilitate the exchange of ideas about audio-visual equipment and its use, Bean pictures the present situation in these words:

> Visual education, in the judgment of the writer, is ready for new and important developments. The steps that have been taken so far are the faltering and playful steps of infancy and early childhood. We have been elated with each new toy as it was invented and presented to a room already full of useful and beautiful playthings. . . . Each development has been

> heralded as the most beautiful, the most interesting, and the most useful, and for a time has eclipsed the others . . . [1]

Just what are these "new and important developments" for which the field is ready?

"New and important developments" will, of course, come in answer to insistent and logical demands from those individuals who actually use and promote these aids. Hence, these developments really represent the "needs" of the field. Just what are these needs? James S. Kinder, after summarizing the research already done in the field of audio-visual education concludes:

> There is a crying need for researches into unit studies and grade level adaptations, application of audio-visual aids in certain areas of instruction and subject matter which are now relatively untouched, evaluations in the realms of attitudes, artistic and aesthetic judgments, objectives, appreciations, learning processes, and a host of others. By comparison with the researches in such fields as achievement tests, extracurricular activities, individual differences, guidance, or public relations, audio-visual education is still near the bottom of the ladder.[2]

In a letter to the authors (Jan. 18, 1940), Kinder adds these:

> More emphases or clearer emphasis on coordination with courses of study, unit planning, and textbook organization . . . School plants designed for audio-visual scheduling . . . Teacher training that stresses actual practice in the using of visual techniques . . . More research on "how the child learns" . . . Specific budgetary provisions so that the acquisition and use of audio-visual aids do not come as afterthoughts if there happens to be a few dollars left in the treasury.

Apparently, there is need for important developments in just about all phases of the activity.

However, undoubtedly there are general and basic needs underlying all of the specific needs, out of which, when satisfied, will grow easily and naturally the satisfaction of these more specific needs. In the opinion of the authors there are three of these needs that stand out most clearly; these needs are (1) the development of leadership, (2) a clarification and validation of objectives, and (3) the cooperation of producers and educators.

Perhaps the most basic of these three needs is leadership, because if this is developed the two others will be satisfied; intelligent leadership will result in clarified and validated objectives and a coordination of the efforts of producers and educators. And, of course, the development and improvement of equipment, materials, and techniques will also come as a result of this leadership. A brief discussion of these three needs will indicate their importance and also show their general interrelationships.[1]

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[1] Bean, D. P.: The Next Step in Visual Education, *Educational Screen*, vol. 18, p. 134, April, 1939.

[2] Kinder, J. S.: Research in Audio-visual Education, *Educational Screen*, vol. 18, pp. 360–361, December, 1939.

The Development of Leadership.—Educators often have been quick to promote some new idea, theory, or practice in their schools without taking time adequately to prepare their teachers for it. How often has this actually happened in American schools: a principal or superintendent hears about some new educational idea or procedure, is immediately intrigued by it, rushes back to his school and literally dumps it into the lap of his faculty with a high-pressure order and a justification of the "This-is-all-the-rage-now-in-modern-education-so-let's-be-up-to-date-and-do-it" type. His teachers, honest and sincere, but without previous training or adequate time for study and preparation, attempt to "do it," with results that are usually tragic, not only temporarily in the failure of the particular project, but also more than temporarily in the attitudes developed by these teachers—attitudes that find expression in the oft-heard statement, "We tried that and it didn't work; it may be all right in theory but it won't work in practice." Proofs of these tragedies are evident in many schools; they are to be found in the long list of home-room failures; in the stacks of given, scored, and publicized, but practically unused, tests and measurements; in the volumes of justifiable, justified, and recommended, but unincorporated curriculum revisions, and in other similar failures.

Intelligent educational leadership avoids these tragedies, or most of them, by encouraging serious and painstaking study and allowing time for it, and by promoting smaller attempts first—tryouts and experiments. The sagacious educator realizes that the education of the teacher, like the education of the pupil, is a rather slow process, and in his policy planning he makes appropriate provision for this. Nor is he disheartened by the cry of "fads and frills" commonly raised when any new educational idea is proposed. He knows that although not all change represents progress, at the same time that there is no progress without change. And he knows that every subject in the school, except the "three R's," was designated a "fad" and a "frill" when it was first suggested. He knows that the "fads and frills" of today are often the essentials of tomorrow.

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[1] The best single pertinent article the authors have read—one that is comprehensive, detailed, and constructive—is that of F. D. McClusky (see bibliography).

The present interest in the field of audio-visual instruction is due to two groups of enthusiasts, the "knowns," who through publication and promotional activities have furthered its development, and the "unknowns"—the teachers, administrators, and other actual users whose efforts have been made on the firing line. The work of these two groups, which may be designated roughly as the theorizers and the practicers, has been complementary. The "knowns" have encouraged, assisted, and publicized the "unknowns," and these have supplied ideas, plans, and materials from their firsthand experience.

Several books and numerous articles have been written, quite a number of teachers' college courses have been offered, materials have been produced and distributed, curricula have been revised, associations have been formed, and meetings without number have been held. But there is still room for improvement. What is now needed is a coordination of all of these forces—an organized and concerted demand for seriously thought-out and carefully planned schedules of training that will not only prepare intelligent leadership in teachers, supervisors, and directors, but also dignify the field, give it caliber and importance, and so bring it up to a par with such other well-established fields as guidance, curriculum construction, measurement, etc. And this is but another way of saying that a strong central national promotional body organization, or office, is needed.

There must be a coordination of the efforts of all of the promoters of audio-visual instruction. Scattered and unorganized efforts are never so effective as concerted action. As was indicated in Chap. I, there are, at the present time, a considerable number of institutions, organizations, associations, and offices that are actively interested in this field. Among these are The Department of Visual Instruction of the National Education Association, governmental and state departments, divisions, bureaus, and offices, state and local educational associations and bodies, public and private loan services of all kinds, universities, colleges, and similar institutions, foundations, and commercial enterprises. These should be organized into some strong body or office for the purposes of (1) assembling, classifying, cataloguing, and publicizing materials; (2) encouraging investigation, experimentation, and research for the evaluation and validating of equipment, materials, and techniques; and (3) promoting meetings, conferences, forums, clinics, and close-by demonstrations;—all for the general ultimate purpose of stimulating the systematic production and distribution, and the effective utilization of these aids.

Naturally, as has been implied repeatedly before, this promotional work should not be something set apart from the other educational fields—curricular, administrative, measurement, guidance, etc.; it must be coordinated with each and all of these. To emphasize again, audio-visual aids are complementary, not substitutionary. Any attempt by audio-visual instruction enthusiasts to dominate these other fields will be met with perfectly proper resentment and opposition by the workers in these fields.

A Clarification and Validation of Objectives.—Obviously, any teaching device is used in order to accomplish certain educational objectives; and, just as obviously, such a device cannot be intelligently used until these specific objectives are known. In general, we know the objectives of particular fields of instruction, but we know less about the possible uses of aids in achieving these objectives. In audio-visual instruction, as in other educational fields of somewhat recent development, guidance, measurement, and activities for instance, educators have been so anxious to get the devices into actual and immediate use that they have not given sufficient serious consideration to the basic philosophy and psychology underlying the utilization of these devices: they have "poked the fire from the top," as Dale aptly expresses it. Complete and completely truthful answers have not been given to the whats, wheres, whens, hows, and whys of these aids. Specifically, in what ways, to what extent, and under what conditions do these aids affect attitudes, contribute knowledge, teach intelligent discussion and reflective thinking, bring inspiration, and motivate learning? These questions must be answered authoritatively.

Many claims, probably most of them more or less apparently logical, and some of them at least somewhat well justified scientifically, have been made. Considerable research has been done in this field of education, and a great deal of investigation is now being carried on in all parts of the country. However, much still remains to be done by both producer and educator before this general field will be accepted and fully accredited by educationists, manufacturers, and citizens. Here too, there must be helpful cooperation between producers and educators. This problem represents another demand for an enlightened and vigorous leadership.

The Cooperation of Producers and Educators.—Although there has been a commendable coordination of efforts of educators and producers of certain types of devices such as, for instance, maps, it is well known that in other instances this cooperation has been slow to develop. And both groups have been responsible.

To illustrate with motion pictures: (1) producers have had great difficulty in distinguishing between education and entertainment; (2) in casting about for other possible fields, the producers, with their exceedingly limited educational insight and background, have produced "educational" pictures that are weak; (3) these productions have been stupidly promoted (by both manufacturer and distributor) with the sales methods and the usual unwise exaggeration—commonly designated, but terribly mislabeled, "advertising"—used in connection with theatrical films; (4) some producers have neglected the educational field—church and school—fearing that production in this would adversely affect their major interest—theatrical films; and (5) they have been so much interested in the large and immediate profits common in their theatrical ventures, that they have not seen fit to give serious attention to the educational field in which quantity production was not demanded, and in which, as a result, film costs had to be inordinately high. In this, of course, the producers were inconsistent; they would gamble a million dollars in a "stupendous," "gigantic," and "colossal" spectacle, but would not invest a hundredth part of this amount in an educational adventure.

On the other hand, educators have been slow to appreciate the possibilities of the motion picture because (1) they realized the differences between devices of entertainment and devices of education, and classified the film in the former group; (2) they quickly recognized the inaccuracies and misemphases—the weaknesses—of the films produced; (3) they were nauseated by the inane and cheap "advertising" used; (4) they resented the sales methods employed; and (5) they feared "robot instruction" would, to some extent, replace them. Hence it was but somewhat natural that educators should oppose the motion picture or, in case of pressure, accept it halfheartedly.

Naturally, these descriptions of the attitudes and activities of producers and educators are not accurate in all instances. There have been a number of outstanding farsighted producers who recognized the potentialities of the educational field, and who, at considerable expense, attempted to develop it;[1] and, likewise, there have been many fine farsighted educators who recognized these possibilities and worked to capitalize them. But, in general, the attitudes of both groups have not been conducive to wholesome cooperation.

It is trite to remark that both of these groups—educators and producers—should pool their resources and cooperate wholeheartedly. In the first place, this means that the educators for whom the films are produced should have a major part of the responsibility for determining their general form and content. And naturally, they cannot have this until the producers recognize and accept this point of view, understand and appreciate instructional (as distinguished from enter-

[1] See the footnote references on p. 148.

tainmental) needs, and respect the educators professionally. This confidence of the producers in the educators must be based not only upon an appreciation of them as experts in instruction, but also upon a recognition that the strictly educational field does offer opportunity for some financial dividends.

In the second place, this cooperation means that the educators appreciate the point of view of the producers, know something about the problems of production and distribution, and recognize the logic of a fair financial profit. Too, it means that the educators must prove their case—conduct surveys, investigations, and researches that will result in definitely justified and validated requests for material. Producers often make the statement, "Teachers don't know what they want; when they decide and tell us, we'll provide the material." Undoubtedly, too, they are right. This responsibility is the educators'.

Further, because of the newness of the field, it is only reasonable that both groups realize the many possibilities of error, misemphasis, and misunderstanding, and so be mutually tolerant of each other's shortcomings. An attitude of "we-are-well-established-and-we-make-no-mistakes" on the part of either group will of course seriously handicap the building up of cordial and helpful relations.

What has been said concerning motion pictures is just as applicable in the case of nearly all of the other aids discussed in this book, photographs, prints, stereographs, glass slides, film strips, charts, textbook illustrations, specimens, objects, models, radio programs, etc. In connection with some of these aids, due to their comparatively low cost and the fact that they have been used in the schools for a long time, and hence, are somewhat "mature" in development, much of this producer-educator cooperation has already been accomplished. However, in order to provide the necessary improvement and changes, even in these instances, there must continue to be a coordination of efforts.

Here again, the need for a strong central educational organization is evident. A competent, representative, and officially authorized advisory committee could collect, collate, and prepare the requests of teachers, supervisors, administrators, and scientific investigators and present these to a similarly representative, competent, and officially authorized committee of producers. Out of this permanent setting of two mutually respectful groups would undoubtedly come the kinds of aid which the schools need. And, because of its permanency, this combined group could continuously promote the improvement of equipment, materials, and techniques.

Our Responsibility.—Much has already been done in the field of audio-visual instruction, and, judging by the extent and the seriousness of the present efforts in the field, much more will be accomplished. This field, as at present emphasized and organized, represents a new movement in education, and as in any pioneering work, misemphases, errors, and mistakes are inevitable. However, these misemphases, errors, and mistakes, like misemphases, errors, and mistakes in any other field of endeavor, really represent failures only if they are not properly capitalized toward avoidance and hence toward ultimate successes. Incidentally, one reason why the movement is intriguing is because it is new. A field which offered no problems to solve, and no opportunities for procedures to be developed or material to be originated—in short, one that offered no challenges—would be uninteresting to a red-blooded, ambitious, and farsighted teacher or administrator.

In conclusion, it is pertinent to point out that educators and producers who recognize the opportunities in this field must accept full responsibility for its ultimate success or failure. Following his investigation, L. H. Chapman states, "The results obtained make it evident that the program of visual education must be systematized and stirred out of its present lethargy. This falls of necessity on the administrators."[1] Further, certainly it is not to the credit of the "insiders"—those who are acquainted with the field and who believe in it, to have "outsiders"—those who lack the appropriate background of information, ideals, and ideas, point out flaws and weaknesses that they should have noted first. In short, those of us who appreciate the many excellent opportunities in the field of audio-visual instruction should be at one and the same time its most severe, and its most intelligent, critics.

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CHAPTER XVI

SOURCES OF MATERIALS AND EQUIPMENT

This section of the book was designed to meet the needs of teachers and administrators who are using, or plan to use, the various types of audio-visual aid described or reflected in the previous pages. Although, naturally, this list of sources is not complete, yet enough has been included to assist in the obtaining of almost any kind of equipment and material required. These sources are grouped in the order in which the various aids are presented in the other chapters of this book.

In general, materials from industrial and commercial firms are free for the asking. However, occasionally a small charge is made. Although, in the case of purchasable materials and equipment, an examination and comparison of the catalogue descriptions of these may not represent conclusive evidence of relative values, yet such an examination and comparison will at least be educative. In fact, one way to stay informed on the developments in the various fields is to obtain and study the most recent catalogues of producing and distributing firms.[1]

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[1] A good list of sources—governmental, professional, and noncommercial—with publications and visual materials tabulated, will be found under the title Teaching Aids for Teachers, by M. D. Davis, in *School Life*, vol. 24, pp. 144–147, February, 1939. See also E. A. Lathrop, Governmental Agencies Supplying Visual Aids, "Thirteenth Yearbook," pp. 460–469, 1934, Department of Elementary School Principals; and Sources of Visual Aids and Equipment for Instructional Use in Schools, *Pamphlet* 80, Office of Education, 1937.

Each volume of "The Enriched Teaching Series," by M. N. Woodring and others, is composed of an annotated listing of sources of material for a particular subject—English, mathematics, science, Latin, commercial subjects, etc. This series is published by Teachers College, Columbia University. See also E. D. Heiss, "Modern Methods and Materials for Teaching Science," The Macmillan Company, New York, 1940, and M. E. Tounsend, and A. G. Stewart, "Audio-visual Aids for Teachers" (Social Science Service Series, II), The H. W. Wilson Company, New York, 1937.

The most complete list of sources of free materials is "The Educator's Directory," a booklet containing about 3,000 items, published by The Continental Press, Harrisburg, Pa.

The outstanding professional journal of this field is *Educational Screen*, published monthly by The Educational Screen, Inc., 64 E. Lake St., Chicago. This

INDUSTRIAL AND COMMERCIAL OBJECTS, SPECIMENS, MODELS, EXHIBITS, BOOKLETS, PAMPHLETS, POSTERS, AND CHARTS

Food Products

American Sugar Refining Company, 120 Wall St., New York. Exhibit and booklet, "The Story of Sugar."

Armour and Company, Chicago. Booklets on meat industry. Food source map.

Borden Company, 350 Madison Avenue, New York. Booklet, "The Story of Condensed Milk."

California Fruit Growers Exchange, Los Angeles. Booklet on growing and packing of lemons.

California and Hawaiian Sugar Refining Corp., Ltd., San Francisco. Booklet, "Something about Sugar."

Chocolate Sales Corporation, Hershey, Pa. Chart on the manufacture of chocolate and cocoa.

Corn Products Refining Company, Edgewater, N. J. Exhibit.

D. and N. Slade Company, Boston. Exhibits of extracts and spices. Booklets.

Hills Bros., 2 Harrison St., San Francisco. Booklet, "Coffee, How It's Grown and How to Make It."

H. J. Heinz Company, Pittsburgh. Booklet, "The Story of 57."

Horlick's Malted Milk Corp., Racine, Wis. Exhibit. Booklet.

International Harvester Company, 606 S. Michigan Ave., Chicago. Crop, farming, and livestock bulletins. Motto cards. Slide and motion pictures.

Kellogg's Home Economics Department, Battle Creek, Mich. Exhibits, score charts, and booklets.

Kraft-Phoenix Cheese Corp., 400 Rush St., Chicago. Booklets on the manufacture and use of cheese.

Pan-American Union, Washington, D. C. Booklets on products of Pan-American Republics.

Pillsbury Flour Mills Company, Minneapolis. Wall chart and book on wheat and flour production.

Quaker Oats Company, 141 W. Jackson Boulevard, Chicago. Booklets: "Grain through the Ages;" "Travels of a Rolled Oat;" "Hob o' the Mill;" "Around The World with Hob."

Ralston Purina Company, Checkerboard Square, St. Louis. Chart and booklets on wheat industry and cereals.

Skookum Packers Association, Wenatchee, Wash. (Fruit.) Outline drawing books. Recipe book.

United Fruit Company, 1 Federal St., Boston. Booklets on bananas. Outline poster for coloring.

Washburn-Crosby Company, Minneapolis. Booklets; "Baking Better Bread" Kernel of Wheat chart; Model Mill chart.

Wilson & Company, 4100 S. Ashland Ave., Chicago. Meat and by-products chart.

company also publishes pertinent books and pamphlets. "The Visual Review" is published annually by the Society for Visual Education, Inc., 100 East Ohio Street, Chicago. It is free. The eleventh volume was issued in 1939. *Scholastic*, 250 E. 43d St., New York, includes a liberal-sized section called Sight and Sound.

Mineral Products

Aluminum Cooking Utensil Company, New Kensington, Pa. Exhibit.
American Bauxite Company, Pittsburgh. Exhibit.
Barber Asphalt Company, 1600 Arch St., Philadelphia. Booklet, "The Wonderland of Trinidad."
Barrett Company, 40 Rector St., New York. Booklets on nitrate of soda and sulphate of ammonia (fertilizers).
Carey Salt Company, Hutchinson, Kan. Exhibit and photographs.
Carter White Lead Company, West Pullman Station, Chicago. Samples.
Corning Glass Works, Corning, N. Y. Exhibits and booklets.
Georgia Marble Company, Tate, Ga. Booklets on marble.
International Silver Company, Meriden, Conn. Booklets on silverware.
Johns-Manville, Inc., Chicago. Samples of asbestos, mill board, and shingles. Booklets.
Keasby and Matteson, Ambler, Pa. Samples of asbestos.
Koppers Company, Pittsburgh. Coal products chart.
Portland Cement Company, New Kensington, Pa. Exhibit.
Rookwood Pottery Company, Cincinnati. Booklet on Rookwood pottery.
U. S. Gypsum Company, 300 W. Adams St., Chicago. Exhibit.

Textile Products

American Thread Company, Inc., New York. Booklet, "The Story of Cotton Thread."
Belding-Heminway-Corticelli, 55 Fremont St., San Francisco. Cocoons exhibit and skein of silk.
Celanese Corporation of America, 180 Madison Ave., New York. Samples. Booklet.
Chippewa Falls Woolen Company, Chippewa Falls, Wis. Wool manufacture exhibit.
Du Pont Fiber Company, Niagara Falls, N. Y. Samples of artificial silk.
Klearflax Linen Looms, Inc., Duluth, Minn. "Eductional Process Exhibit"; "Interior Decorating Exhibit."
L. C. Chase & Company, 295 Fifth Ave., New York. Booklet on mohair velvet. Exhibit.
Realsilk Hosiery Mills, Inc., Indianapolis. Exhibit of cocoons and skeins. Booklets on silk industry.
Silk Association of America, Inc., 468 Fourth Ave., New York. Exhibit of cocoons and skeins. Booklets.
Singer Sewing Machine Company, Singer Building, New York. Colored slides. Booklets.
William Skinner & Sons, 305 W. Adams St., Chicago. Booklets.

Wood Products

Chicago Cork Works Company, 2600 N. Crawford Ave., Chicago. Exhibit showing cork manufacture and products. Booklets.
Hammermill Paper Company, Erie, Pa. Exhibits. Booklets.
Kimlark Rug Company, Neenah, Wis. Paper rug exhibit.

Southern Cypress Manufacturers Association, New Orleans. Booklet on manufacture and uses of cypress.

Strathmore Paper Company, Mittineague, Mass. Booklet.

Upson Company, Lockport, N. Y. Exhibit of wallboard samples.

Miscellaneous Products

American Automobile Association, Mills Building, Washington, D. C. Booklets, films, posters, exhibits.

American Forestry Association, 1713 K St., Washington D. C. Bulletins, posters.

American Hard Rubber Company, Essex Ave., Gloucester, Mass. Glue exhibits.

American Humane Education Society, 180 Longwood Ave., Boston. Bulletins, slides, posters, exhibits.

American Junior Red Cross, Washington D. C. Booklets, posters, pictures, exhibits.

Bristol-Myers Company, 75 West St., New York. Health and cleanliness charts.

Clay-Adams Company, 117 East 24th St., New York. Specimens, models, charts, etc. Write for catalogue.

Commercial Museum, 34th and Spruce Sts., Philadelphia. Exhibits. Send for list and terms.

Congoleum Nairn, Inc., 195 Belgrove Drive, Kearny, N. J. Booklets on linoleum and congoleum rugs.

Denoyer-Geppert Company, 5235 Ravenswood Ave., Chicago. Exhibits, specimens, objects, charts, maps, slides, etc. Send for catalogue.

Eberhard Faber Pencil Company, 37 Greenpoint Ave., Brooklyn, N. Y. Exhibit of pencils and erasers. Booklets.

Esterbrook Steel Pen Manufacturing Company, Camden, N. J. Exhibit. Booklets.

General Biological Supply House, 761 East 69 Place, Chicago. Scientific materials. Send for catalogue.

Goodyear Tire & Rubber Company, Akron, Ohio. Booklet, "The Story of the Tire." Motion Pictures.

J. Weiss & Sons Company, 33 Littleton Ave., Newark, N. J. Scissors exhibit.

L. E. Waterman Company, 609 Market St., San Francisco. Exhibit. Booklets on pens and writing.

National Association of Audubon Societies, 1775 Broadway, New York. Bulletins, films, slides, posters, pictures, exhibits.

National Carbon Company, New York. Cutaway dry cell.

National Child Welfare Association, 70 Fifth Ave., New York. Colored panels on health. Mother Goose rhymes.

National Council for the Prevention of War, 532 17th St., N. W., Washington, D. C. Bulletins, posters, pictures, exhibits.

National Safety Council, 20 North Wacker Drive, Chicago. Booklets, posters, exhibits.

National Tuberculosis Association, 50 West 50th St., New York. Bulletins, posters, pictures, exhibits.

Oakville Company, Waterbury, Conn. Thimble-manufacture exhibit.

Palmolive Company, 42–60 Fourth Ave., Milwaukee, Wis. Soap exhibit.

Procter & Gamble, Educational Department, Cincinnati. Booklets, charts, posters, reading cards, maps, soap-sculpture instructions.

Russia Cement Company, Essex Ave., Gloucester, Mass. Glue exhibits.
Schroeder & Tremayne, 500 N. Commercial St., St. Louis. Sponge exhibit.
Spencerian Pen Company, 349 Broadway, New York. Exhibit. Booklets.
Spool Cotton Company, 350 Fifth Ave., New York. Loan exhibit.
Van Briggle Art Pottery Company, Colorado Springs, Colo. Booklets.
Wild Flower Preservation Society, Inc., 3740 Oliver St., N. W., Washington, D. C. Bulletins, posters, pictures, exhibits.

CHARTS, GLOBES, AND MAPS

A. J. Nystrom & Company, 3333 Elston Ave., Chicago.
Denoyer-Geppert Company, 5235 Ravenswood Ave., Chicago.
Department of Commerce, Washington D. C. Graphic Index of charts, free; U. S. Coast and Geodetic Survey charts.
Department of the Interior, Washington, D. C. U. S. Geological Survey Maps.
Keuffel and Esser, 127 Fulton St., New York. Large-sized drawing paper.
National Geographic Society, Sixteenth and M Sts., Washington, D. C.
Navy Department, Hydrographic Office, Washington, D. C. Charts.
Pictorial Statistics, Inc., 142 Lexington Ave., New York. Inexpensive booklet, "Instructions for Chartmakers," and twenty-five different symbol sheets.
Rand McNally & Company, Chicago.
War Department, Corps of Engineers, Washington, D. C. Charts.
Weber Costello Company, Chicago Heights, Ill.

TRAVEL, REAL AND IMAGINARY

Nearly all steamship lines and railroad companies publish attractive booklets, folders, maps, charts, and other materials that may be obtained without cost. The following are illustrative of these and other travel information services.

Alaska Steamship Company, Seattle, Wash.
Associated British and Irish Railways, 9 Rockefeller Plaza, New York.
Atchison, Topeka, and Santa Fe Railway System, 80 East Jackson Boulevard, Chicago.
C. B. & Q Railroad, 547 West Jackson Boulevard, Chicago.
Capitol Greyhound Travel Bureau, 245 West 50th St., New York.
China Society of America, 570 Lexington Ave., New York.
Cunard Line, 25 Broadway, New York.
French Line, Educational Department, 610 Fifth Ave., New York.
German Railroads, 10 East 57th St., New York.
Hamburg American Line, 28 Broadway, New York.
International Friendship League, 603 Baylston St., Boston.
Italian Tourist Information, 626 Fifth Ave., New York.
Junior Red Cross, Washington, D. C.
Kansas State Teachers College, Extension Division, Emporia, Kan. Excellent list of geography materials.
National Child Welfare Association, 70 Fifth Ave., New York.
National Council for the Prevention of War, 532 Seventh St., Washington, D. C.
National Emergency Council, Washington, D. C.
National Park Service, Department of the Interior, Washington, D. C.
N. Y. K. Line, 25 Broadway, New York.

Northern Pacific Railroad Company, Passenger Traffic Department, St. Paul, Minn.
Norwegian Travel Information, 580 Fifth Ave., New York.
Southern Pacific Company, 65 Market St., San Francisco.

PHOTOGRAPHS AND PRINTS

Art Extension Press, Inc., Westport, Conn.
Art Institute, Chicago.
Asahel Curtis Photo Company, 625 Coleman Building, Seattle, Wash.
Brentano's, Fifth Ave., New York.
Brown-Robertson Company, Inc., 8–10 East 19th St., New York.
Brown's Famous Pictures, 38 Lovett St., Boston.
Colonial Art Company, Oklahoma City, Okla.
Cosmopolitan Print Department, 119 West 40th St., New York.
Denoyer-Geppert Company, 5235 Ravenswood Ave., Chicago.
Detroit Publishing Company, Detroit.
Division of Motion Pictures, U. S. Department of Interior, Washington, D. C.
Edited Picture System, 330 West 42d St., New York.
Elson Art Publication, School St., Belmont, Mass.
E. Weyhe, 794 Lexington Ave., New York.
George Washington Memorial Association, 386 Fourth Ave., New York.
House of Art, 59 West 19th St., New York.
H. W. Wilson Company, 950 University Ave., New York.
Medici Society of America, 755 Boylston St., Boston.
Metropolitan Museum of Fine Arts, New York.
Milton Bradley Company, Springfield, Mass.
National Child Welfare Association, Inc., 70 Fifth Ave., New York.
National Geographic Society, Sixteenth and M Sts., Washington, D. C.
Orthovis Printing Company, Chicago.
Perry Pictures Company, Malden, Mass.
Photographic History Service, 5537 Hollywood Boulevard, Hollywood, Calif.
Poster-Lesson-Course, Scientific Education Publishers, Los Angeles.
Publishers Photo Service, Inc., 105 West 40th St., New York.
Rudolph Lesch, 225 Fifth Ave., New York.
Swedish State Railways, Travel Information Bureau, 551 Fifth Ave., New York.
University Prints, 11 Boyd Street, Newton, Mass.
Wild Flower Preservation Society, 3740 Oliver St., Washington, D. C.
Yosemite Park & Curry Company, Yosemite National Park, Cal.

POST CARDS

Post cards, which may be used for both nonprojection and projection purposes, may be obtained from the following companies.

Art

American News Company, New York.
British Museum, London, England.
Canada Railway News Company, Ltd., Toronto, Canada.
C. P. Johnson Company, Seattle, Wash.
International Art Publishing Company, 242 West Lafayette Boulevard, Detroit.

Scenic

Detroit Publishing Company, Detroit.
Hawaii and South Seas Curio Company, Honolulu, Hawaii.
Pacific Novelty Company, San Francisco.
Philadelphia Post Card Company, Philadelphia.
Rotograph Company, New York.
Santa Fe Company, San Francisco.
Southern Pacific Company, Oakland Pier, Oakland, Calif.

ILLUSTRATED MAGAZINES

A great deal of useful material may be obtained from such illustrated magazines as the following:

Asia. Asia Magazine, Inc., 461 Eighth Ave., New York.
Current History. New York Times Company, New York.
Economic Geography. Clark University, Worcester, Mass.
Good Housekeeping. 119 West 40th St., New York.
Japan. Toyo Kisen Kaisha Company, 551 Market St., San Francisco.
Ladies' Home Journal. Curtis Publishing Company, Philadelphia.
Mentor, The. Crowell Publishing Company, Springfield, Ohio.
National Geographic Magazine. Hubbard Memorial Hall, Washington D. C.
Nature Magazine. American Nature Association, Washington, D. C.
Travel. Robert McBride Company, 7 West 16th St., New York.

PROJECTION SLIDES

Stereographs and Stereoscopes

E. Leitz, Inc., 60 East 10th St., New York.
Keystone View Company, Meadville, Pa.

Glass Slides

Board of Christian Education and Publication, 1505 Race St., Philadephia.
Conrad Slide and Projection Company, Superior, Wis.
Division of Motion Pictures, Department of the Interior, Washington, D. C.
Fairchild Aerial Surveys, Inc., 224 East 11th St., Los Angeles.
H. E. Floercky, 543 Muirfield Road, Los Angeles.
Henry G. Peabody, Pasadena, Calif.
International Art Prints, 64 East Lake St., Chicago.
Keystone View Company, Meadville, Pa.
Photographic History Service, 5127 Franklin Ave., Hollywood, Calif.
Sims Visual Music Company, Quincy, Ill.
Victor Animatograph Company, Davenport, Iowa.

Filmslides

Classroom Teacher, Inc., 100 E. Ohio St., Chicago.
Division of Motion Pictures, Department of the Interior, Washington, D. C.
Eye Gate House, Inc., 330 W. 42d St., New York.
General Electric Company, Motion Picture Division, Schenectady, N. Y.

Long Filmslide Service, 944 Regal Road, Berkeley, Calif.
Nature Study Illustrated, San José State Teachers College, San José, Calif.
Society for Visual Education, Inc., 100 East Ohio St., Chicago.
The Stanley Bowmar Company, 2929 Broadway, New York.
United States Department of Agriculture, Washington, D. C.
University Museum Extension Lecture Bureau, 10 S. 18th St., Philadelphia.
Visual Instruction Service, University Museum, University of Pennsylvania, Philadelphia.

SLIDE PROJECTORS AND ACCESSORIES

Glass Slide and Opaque Projectors

Bausch & Lomb Optical Company, Rochester, N. Y.
Charles Beseler Company, 131 East 23d St., New York.
Keystone View Company, Meadville, Pa.
Spencer Lens Company, Buffalo, N. Y.
Spindler and Saupe, Inc., 86 Third St., San Francisco.
Trans-Lux Daylight Picture Company, 247 Park Ave., New York.
Victor Animatograph Company, Davenport, Iowa.

Filmslide Projectors and Attachments

Bausch & Lomb Optical Company, Rochester, N. Y.
Eastman Kodak Company, Rochester, N. Y.
E. Leitz, Inc., 60 East 10th St., New York.
International Industries, Inc., Ann Arbor, Mich.
Society for Visual Education, Inc., 100 East Ohio St., Chicago.
Spencer Lens Company, Buffalo, N. Y.
Victor Animatograph Company, Davenport, Iowa.

Slide-making Materials

Celluloid Corporation, 290 Ferry St., Newark, N. J.
Eastman Kodak Company, Rochester, N. Y.
Keystone View Company, Meadville, Pa.
National Theatre Supply Company, 90 Gold St., New York. (Branches in twenty-six principal cities.)
Radio Mat Slide Company, Inc., 1819 Broadway, New York.
Scarborite Colors, Inc., Scarborough-on-Hudson, N. Y.
Society for Visual Education, Inc., 100 East Ohio St., Chicago. (For 2″ × 2″ slides.)
Victor Animatograph Company, Davenport, Iowa.

Filmslide Cameras

Agfa-Ansco Corporation, Binghamton, N. Y.
Carl Zeiss, Inc., 485 Fifth Ave., New York.
Eastman Kodak Company, Rochester, N. Y.
E. Leitz, Inc., 60 East 10th St., New York.
Folmer-Graflex Corporation, Rochester, N. Y.
International Industries, Inc., Ann Arbor, Mich.
Society for Visual Education, Inc., 100 East Ohio St., Chicago.

FILM CABINETS

American Film-Safe Corporation, 1800 Washington Boulevard, Baltimore.
Belson Manufacturing Company, 800 Sibley St., Chicago.
Chicago Cinema Products Company, 1736 N. Springfield Ave., Chicago.
Edw. H. Wolk, 1018 S. Wabash Ave., Chicago.
E. E. Fulton Company, 1018 S. Wabash Ave., Chicago.
Good-All Electric Manufacturing Company, 251 Spruce St., Ogallala, Neb.
National Theatre Supply Company, 92–96 Gold St., New York.
Neumade Products Corporation, 427 West 42d St., New York.
Wenzel Company, 2507 South State St., Chicago.

SOURCES OF FILMS

Films may be rented from numerous sources throughout the United States. Space does not permit the inclusion of a complete list of sources. Consequently, the authors recommend these three books: "1000 and One—The Blue Book of Non-Theatrical Films," published by The Educational Screen, 64 E. Lake St., Chicago; "The Educator's Directory," The Continental Press, Harrisburg, Pa.; and "Sources of Visual Aids and Equipment for Instructor's Use in Schools," Division of Motion Pictures, Department of the Interior, Washington, D. C.

The above publications list the names of the various companies that have films either for sale or for rent. In addition, they include a great many companies that circulate films without charge to the school other than transportation. In most of the states there are circulating libraries operated by universities, teachers' colleges and other educational institutions. A complete list of these libraries in the Middle West may be secured from the Victor Animatograph Company, Davenport, Iowa.

The Association of School Film Libraries, of Rockefeller Plaza, New York, issues helpful catalogues and news letters.

Films that have been definitely prepared for use in the classroom may be purchased from the following companies:

Bell & Howell Company, 1801 Larchmont Ave., Chicago.
Eastman Kodak Company, Rochester, N. Y.
Erpi Classroom Films, Inc., 35–11 Thirty-fifth Ave., Long Island City, N. Y.
Garrison Film Distributors, 1600 Broadway, New York.
Herman A. DeVry, Inc., 1111 W. Armitage Ave., Chicago.
The Edited Picture Corporation, 330 West 42d St., New York.
Walter O. Gullohn, Inc., 35 West 45th St., New York.

16-mm. MOTION-PICTURE PROJECTORS (Silent and Sound)

Ampro Corporation, 2839 North Western Ave., Chicago.
Bell & Howell Company, 1801 Larchmont Ave., Chicago.
Classroom Teacher, Inc., 100 E. Ohio St., Chicago.
Eastman Kodak Company, Rochester, N. Y.
Herman A. DeVry, Inc., 1111 W. Armitage Ave., Chicago.
International Projector Corporation, 90 Gold St., New York.
Society for Visual Education, Inc., 100 East Ohio St., Chicago.
Victor Animatograph Company, Davenport, Ia.

SCREENS FOR PROJECTION

Bausch & Lomb Optical Company Rochester, N. Y.
Bell & Howell Company, 1801 Larchmont Ave., Chicago.
Crystal Movie Screen Corporation, Celina, Ohio.
Da-Lite Screen Company, Inc., 2723 N. Pulaski Road, Chicago.
Eastman Kodak Company, Rochester, N. Y.
Herman A. DeVry, Inc., 1111 W. Armitage Ave., Chicago.
Keystone View Company, Meadville, Pa.
National Theatre Supply Company, 90 Gold St., New York.
Raven Screen Corporation, 145 East 24th St., New York.
R. C. A. Manufacturing Company, Inc., Educational Department, Camden, N. J.
Society for Visual Education, Inc., 100 E. Ohio St., Chicago.
Spencer Lens Company, Buffalo, N. Y.
Trans-Lux Daylight Picture Screen Corporation, 1270 Sixth Ave., New York.
Victor Animatograph Corporation, Davenport, Iowa.

16-mm. MOTION-PICTURE CAMERAS

Agfa-Ansco Corporation, Binghamton, N. Y.
Bell & Howell Company, 1801 Larchmont Ave., Chicago.
Eastman Kodak Company, Rochester, N. Y.
Herman A. DeVry, Inc., 1111 W. Armitage Ave., Chicago.
International Projector Corporation, 90 Gold St., New York.
Victor Animatograph Corporation, Davenport, Iowa.

EXPOSURE METERS

Western Electrical Instrument Corporation, Newark, N. J.
Willoughbys, 10 West 32d St., New York.

RADIO MATERIAL

General Sources

Columbia Broadcasting System, 485 Madison Ave., New York, N. Y.
Committee on Scientific Aids to Learning, 41 East 42d St., New York.
Educational Department, National Association of Broadcasters, 1626 K St., N. W., Washington, D. C.
Institute for Education by Radio, Yearbooks (Ninth, 1939), The Ohio State University, Columbus, Ohio.
National Broadcasting Company, 30 Rockefeller Plaza, New York.
National Committee on Education by Radio, 1 Madison Ave., New York.
Office of Education, U. S. Department of the Interior, Washington, D. C.
The Nation's School of the Air, Station WLW, Cincinnati.

Radio Receiving Sets

Crosley Radio Corporation, Cincinnati.
Emerson Radio and Phonograph Corporation, 111 Eighth Ave., New York.
Galvin Manufacturing Corporation, Chicago.
Philco Radio and Television Corporation, Philadelphia.
RCA Manufacturing Company, Inc., Educational Department, Camden, N. J.

Stromberg-Carlson Telephone Manufacturing Company, 100 Carlson Road, Rochester, N. Y.

Microphones, Amplifiers, and Public-address Systems

Audio Research, Inc., 105–107 East 16th St., New York.
Herman A. DeVry, Inc., 1111 Armitage Ave., Chicago.
Electrical Research Products, 250 West 57th St., New York.
Electro-Acoustic Products Company, Fort Wayne, Ind.
Jensen Radio Manufacturing Company, 6601 S. Laramie Ave., Chicago.
Kansas City Sound Service Company, 130 W. 18th St., Kansas City, Mo.
Mellaphone Corporation, Rochester, N. Y.
Motiograph, Inc., 4431 W. Lake St., Chicago.
National Theatre Supply Company, 92–96 Gold St., New York.
Pacent Engineering Corporation, 79 Madison Ave., New York.
RCA Manufacturing Company, Educational Department, Camden, N. J.
Safety Projector Company, 310 W. Second St., Duluth, Minn.
Universal Microphone Company, Ltd., Inglewood, Calif.
Webster Electric Company, Racine, Wis.

RECORDS, PHONOGRAPHS, AND RECORD PLAYERS

Columbia Phonograph Company, New York.
Electro-Acoustics Products, Inc., Fort Wayne, Ind.
Emerson Radio and Phonograph Corporation, New York.
Fairchild Recording Company, Woodside, Long Island, N. Y.
Philco Radio and Television Corporation, Philadelphia.
RCA Manufacturing Company, Inc., Camden, N. J.
Sonora Electric Phonograph Company, New York.

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